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THE INDICATIONS FOR SURGICAL INTERFERENCE IN DISEASE OF THE FAUCIAL TONSILS AND THE METHODS OF CHOICE IN OPERATING. AN ANALYSIS OF 480 CASES.

BY W. E. CASSELBERRY, M.D., CHICAGO.

The indications for surgical interference in disease of the faucial tonsils are both systemic and local. In certain types of "rheumatism," endocarditis, nephritis and phlebitis clinical observation indicates that the tonsils serve as portals of infection. Recently, three cases of serious endocarditis in which the initial lesion was an acute tonsillitis have passed under my notice and these children were maimed for life by the resulting valvular defects. Nephritis, I have repeatedly observed to follow tonsillitis and while it is usually temporary, I recall one instance in particular, the youthful son of a prominent physician in whom the albuminuria with casts persisted for years. My mention of phlebitis, is based on a single case, a robust man who after an acute inflammation of the tonsils and without other cause, was affected by an obstructive inflammation of the saphenous vein, which was ascribed with such conviction by his physicians to the initial infection in the throat, that he applied for a tonsillectomy. In none of these cases were the tonsils greatly enlarged. Although they may be so, many of them fall under the now familiar designation "small but diseased tonsils," while in rare instances there is no chronic structural change apparent.

Acute articular rheumatism is difficult to differentiate from arthritis of the type known to follow such acute infectious diseases as scarlet fever, small pox, pneumonia, etc. Most of the cases of

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so-called "rheumatism" following tonsillitis doubtless belong to this class of secondary arthritis. To exemplify this group I will mention briefly the case of a lad whose tonsils were much hypertrophied and contained multiple puriform foci. Attacks of polyarthritides, supposedly "rheumatism," usually followed the attacks of acute tonsillitis, the patient in consequence being a chronic invalid. Tonsillectomy suspended promptly and permanently both the tonsillitis and the secondary arthritis.

This and other clinical evidence are confirmed by the studies of Goodale² who found in about one-third of the cases of tonsillitis, minute intrafollicular abscesses. In certain specimens it was possible to trace microscopically the polynuclear leucocytes as they wandered from these little abscesses along the lymph channels to the tonsil base and he quotes Pirera³ as having traced, in animal experiments, pathogenic germs thence to the adjacent cervical glands. Jonathan Wright, while denying that nature's conditions of infection and immunity can be thus paralleled in the laboratory, still concedes the main fact from his clinical⁴ and microscopic⁵ evidence, that pathogenic bacteria are absorbed through the tonsillar epithelium.

Acute tonsillitis, itself, is a sufficient evil; it impairs a child's vigor, retards development and interrupts his studies. An attack now and then may be disregarded; but frequently recurrent tonsillitis, especially in view of possible complications, I regard as an indication of tonsillectomy. Usually the tonsils are at the same time otherwise diseased.

Of the systemic infections, the gravest of all with respect to the tonsils is tuberculosis. Their crypts are points of inferior resistance to tubercle bacilli, for the reason that here the epithelium has little coherence⁶ and the further defense inherent to protoplasm proves inadequate. They pass with the current into the tonsillar lymph spaces where most of the bacilli themselves disappear from microscopic view, having first produced characteristic histologic tubercles, but no lesions visible to the naked eye. I have rarely seen, clinically, tuberculosis of the tonsils; yet Wood's⁷ post-mortem pathologic diagnoses show that in 69 per cent of cases of advanced pulmonary tuberculosis the tonsils are tuberculous, and that in 5 per cent of apparently simple hypertrophy of tonsils and adenoids the excised specimens are tuberculous.

However that enough tubercle bacilli can succeed in passing through the tonsils to infect the cervical glands has been proven by

George B. Wood⁸ with domestic pigs, which were killed from 20 to 40 days after swabbing the tonsils with a culture. His specimens, which I have had opportunity personally to examine, are very convincing not only of the course of the infection from the tonsils to the cervical glands, but thence also through the system.

Simple pyogenic cervical adenitis and tuberculosis of the cervical lymphatic glands are so related that they are necessarily considered together. Pyogenic infection transmitted from the tonsils, is the most prolific primary cause of glandular hyperplasia. With amelioration of the tonsillar inflammation, the lymphatic glandular enlargement subsides but not wholly, as it is prone to be still worse with the next attack. If now, before the glandular enlargement becomes permanently established, the tonsils be excised, the cervical adenitis will in time wholly disappear. In illustration of this type of simple pyogenic adenitis I may cite the case of Miss D., aged 14, daughter of a physician, whose glandular enlargement receded promptly after tonsillectomy and disappeared entirely in the course of a year. If however, the cervical glandular enlargement has become persistent, it is probable that a tuberculous infection has been added to the pyogenic hyperplasia or else it has been tuberculous from the start. The two infections co-exist more or less. It favors recovery as well as prophylaxis to act upon the theory that continued pyogenic invasion from the tonsils predisposes the cervical lymphatic glands to tuberculosis as even in the tuberculous type the swellings usually diminish after tonsillectomy, although more slowly and not often completely. These opinions, based upon personal clinical records, are supported in the main by Nichol⁹, whose investigation embraced 500 cases of cervical adenitis mostly operated upon in the Royal Hospital for children. Further, he estimates the proportion of pyogenic to tuberculous cases as two to three.

For these reasons one must regard cervical adenitis, in any degree approaching persistency, as an indication for immediate tonsillectomy.

Another indication for surgical interference is the systemic toxemia which may result from the putrefaction of accumulated debris in the crypts of the tonsils. The symptoms are not very definite, a pallid, muddy or blemished complexion, impairment of health and strength and dyspeptic complaints, being so general that when due to this cause it is apt to be only through the patient's own intuition, as suggested by a nauseating odor and taste, that the fact is first suspected. Confirmation is established, in reasonable numbers,

through disappearance of the symptoms after tonsillectomy, the size, depth and high degree of foetidness of the concretions, thus disclosed, being sometimes amazing.

Tonsillar concretions, moreover, are responsible for much local discomfort of the throat. The "submerged tonsil," the "small but diseased tonsil" and the hidden "velar lobe" of the tonsil being all descriptive of conditions which impede the drainage of the crypts. The mysteries of chronic pharyngitis, of red and sensitive faucial pillars and peritonsillar abscess are dispelled when, during retraction by a hook, of the covering plica triangularis and muscular anterior pillar, cheesy concretions are forced into view from previously hidden, inverted or constricted crypts.

To meet most of these indications effectively, experience teaches that the excision must be reasonably thorough; or else, in the stumps, tonsillitis is liable to recur, concretions still to form or hypertrophy to redevelop.

The adoption of tonsillectomy as the ideal operation, even though this ideal be not always exactly fulfilled, lends more importance to the inquiry with respect to the protective and other functions of the tonsils. The tonsillar crypts always contain pathogenic germs against which nature seeks to provide by phagocytosis, the engaging polynuclear neutrophiles however, coming not from the lymphoid tissue,¹⁰ per se, but from the blood so that this is a protection only against the evil of the tonsils themselves. More stress is now laid upon the bactericidal¹¹ properties of the juice of lymphoid glands and upon the vaso-tonic effects of an internal secretion¹², but it will be remembered that aside from the tonsils there are other lymphoid tissues which seemingly are quite adequate to care for these functions. Certain it is that no functional ill effects are discernible from tonsillectomy.

The advancing popularity of the newer term tonsillectomy, rather than tonsillotomy, is indicative of a general attitude favorable to total excision of the faucial tonsils; and I am convinced that the more nearly we can conform to this ideal, that is within the limits of expediency and safety, the more satisfactory will be the results. In certain cases, complete enucleation is accomplished easily and perhaps more safely than partial abscission; while, in others, so irregularly and deeply may the tonsil extend, so infolded by muscular pillars and adherent to fibrous capsule may it be found, that to follow it to its ultimate recesses in an effort to remove every fragment will require the highest degree of skill and the best judgment in order to avoid hazard. Close and deep dissection may be required

rather than easy enucleation and the liability to troublesome hemorrhage is thereby increased.

The methods of choice in operating, have reference particularly to the avoidance of hazard, the minimizing of pain and the effectiveness, permanence and harmlessness of the result. In order better to judge, I have scrutinized my records of faucial tonsil operations, which total 480 private cases, most of them double, in many of which opportunities were afforded years after to determine the final condition.



Fig. I. Casselberry's Tonsillotome.

Of children under 14 years of age, operated with general anesthesia, there are 165, of whom nine-tenths took ether, alone or preceded by a few whiffs of A. C. E., mixture, the ether serving satisfactorily for the operation and without accident or detriment of any sort. Even the usual slight risk of ether anesthesia is probably further lessened by the brevity of this operation.



Fig. II. Casselberry's Spoon-edged Tonsil Forceps.

The present technique is briefly as follows: When well etherized the patient's head and shoulders are raised on the operating table by a firm compact roll made by winding a pillow endwise into a sheet. The membranous tense edge of the anterior faucial pillar is then "nicked" near its junction with the velum which helps to disengage the tonsil including the velar lobe from its socket. The

writer's simplified plain ring tonsillotome (Fig. 1), not too sharp, is adjusted, the tonsil drawn into it by special grasping forceps (Figs. II and III) and shelled out from its capsule rather than cut through. Instantly the same instruments are returned again and again for the velar lobe or any other escaping fragments. Blood having gathered, a slight gurgle warns one to lower and turn the patient's head for its escape, this bleeding interval being used to "go on with the anesthetic" before repeating the same procedure upon the other side.



Fig. III. Casselberry's Three Prong Vulsellum Forceps.

The other tenth of this anesthesia series had gas or bromide of ethyl, the suitability of which for modern tonsillectomy is limited to easy cases of the pedunculated type which do not require prolonged dissection.

Of children under 14, but mostly over 10 years of age, operated with local cocaine anesthesia there are 112. A fresh 5 per cent cocaine solution supplemented by adrenalin is applied by repeated



Fig. 4. Casselberry's Vulsellum Forceps. (Replaced by Fig. 3.)

spraying, care being taken to direct it by an angular spray-tip into the crypts and pillar crevices. Also, to minimize pain, the tonsillotome in this class should be very sharp, but its method of use is the same, and in spite of the patient's disquietude one should quickly search for and excise each and all of the fragments which escape the primary cut. Whether a single or double tonsillectomy is thus

made at a sitting and the exact degree of thoroughness attained will depend upon the child's endurance and other circumstances. In these two groups which aggregate 277 children under 14 years of age, there has been no case of unusual hemorrhage although the fact that it might occur, sometimes influences me in the unanesthetized cases to operate only on one side at a time.

The final results can be compared only in a general way. Acute tonsillitis in certain susceptible persons is liable to recur in the merest remaining trace of tonsillar tissue but the disease being now mild and infrequent, it is unfair to rank it as a regular recurrence. On the other hand, if a third or half the tonsil be left it is prone to grow again and be subject to all the old complaints. Also, if in an operation for the prevention of peritonsillar abscess the velar lobe be overlooked, the result will be ineffective.

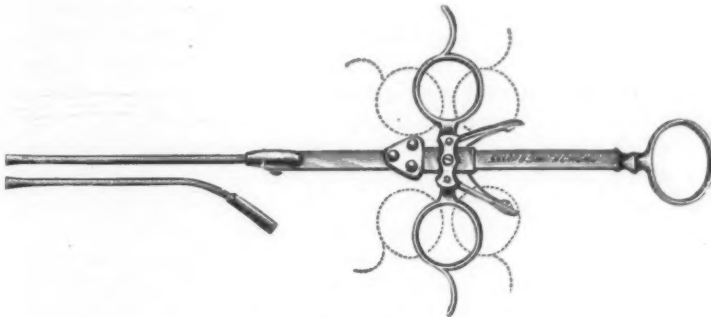


Fig. V. Casselberry's Snare.

I have on record final information obtained indirectly from the parents, friends or physicians or directly by re-examination, in about two-fifths of the above enumerated operations on children, from which it is estimated that the ratio of recurrences in the ether-series is 1:6 and in the cocaine-series 1:4. These figures favor the anesthetic method; moreover most of the recurrences having occurred in the cases of an earlier period when incomplete tonsillotomy was in vogue, they also argue in favor of modern tonsillectomy. To avoid misapprehension, I should state that this ratio does not apply to adenoid growths which in my experience have very rarely recurred, nor does it mean that actual hypertrophy of the faucial tonsils re-

developed so often, but only that some form of troublesome tonsillar disease again appeared.

I have commented on the total absence of unusual hemorrhage in each of the two series of operations on children under 14 years of age. In contrast, out of 203 operations, mostly double, in adult life, seriously troublesome hemorrhage occurred in 14, two of which were in persons as young as 15 years. The effort to avoid this contingency has led to a variety of methods in operating on adults, no one of which is universally suitable. In recent years, I have given first consideration to the cold wire snare, regarding it as a method of comparative although not perfect safety. One needs usually to expose the tonsillar base by preliminary shallow incisions, above and below, thus preparing a place for the number six wire loop by which the bulk of the excision is made. Any fragments which escape the snare are at once grasped by a dull-edged crushing forceps and further detached by scissors. The author's snare (Fig. V), as perfected for this purpose, can be manipulated by one hand, has strength without clumsiness and is suitable also for nasal use. As general anesthesia is not used in adults unless demanded by the patient, the method by the cold snare has proven painful in spite of cocaine, so that in the selection of cases regard must be paid to their fortitude, which explains why in this series of 203 private adult patients I have recorded its use in only 16. The cautery snare which was earlier employed in an equal number, I now seldom use. "Cautery dissection" never appealed to me, although it has its earnest advocates.

Of the 14 hemorrhages mentioned, one was a cautery snare case, 3 were incident to fragmental dissection and 10 followed the use of the tonsillotome. None resulted from the cold snare nor has any occurred from it as yet, in the additional cold snare cases of my clinic.

I give second consideration in adults to what I will term the fragmental method, morcellement of the French. One or more fragments are excised at a sitting by means of scissors or tonsil punch, completion being reached in several sittings. Naturally the 48 cases which compose this group include chiefly those of "small but diseased tonsils." Seven cases of recurrent peritonsillar abscess were thus remedied, the method being especially adapted for cautious excision of the velar lobe, while out of ten additional cases of peritonsillar abscess operated otherwise two suffered recurrence. In the three hemorrhage cases which arose out of the 48 subjected to the fragmental method, the spurting vessels were the more readily controlled by reason of the limited field of operation.

The tonsillotome, as a method of choice for adults, I long since relegated to third place, hence it is a little surprising to find from my records that as many as 122 out of the 203 adults were operated by means of it. Some, though classed as adults, were just out of childhood, while in others the tonsils still retained a youthful softness of texture. Often the alternative was presented of doing it in this quick familiar manner or not at all; indeed the tonsillotome may be selected merely as a matter of expediency, provided one has at hand the best haemostatic appliances and feels competent to cope with a serious hemorrhage, should it occur as in fact it did in 10 out of the 122, or to state the ratio in terms of single tonsils 1:25.

In conclusion, it may not be superfluous to state that in no instance has any ultimate harm resulted from the operation—nothing but good. Lambert Lack²¹ reports a case of loss of singing voice. My series includes but eight vocalists and perhaps an equal number of public speakers, in all of whom the voice was improved, but the number would be larger were it not that in singers I have limited the operation to those in whom the tonsillar disease itself seemed about to destroy the voice, so that I believe that vocalists form no exception to the rule that wherever the tonsillectomy is really indicated, enhanced general vigor and vocal sturdiness may be expected to result from the operation.

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SOME AFFECTIONS OF THE LIPS, MOUTH AND TONGUE, AS SEEN BY THE DERMATOLOGIST.

BY WILLIAM S. GOTTHEIL, M.D., NEW YORK.

(Serial Paper—Second Part.)

(Continued from page 350.)

Case 4. *Herpetiform Chancre of the Lip.* (Figure 4.)

This patient was a colored boy 22 years old, who appeared at my clinic with the complaint that he had been suffering from "fever sores" for two weeks. The auto-diagnosis was apparently correct. There was a small, non-indurated tumefaction on the left side of the lower lip, on the surface of which there were three small circular crust-covered shallow erosions. There were no glands, and no other complaints; and so sure did I feel of the diagnosis that I made no further examination, and prescribed a simple local remedy.

Seen again after a week, the patient's condition was found unchanged. The superficial erosions were of the same size, and covered with slightly adherent crusts; and the very moderate induration of the lesion was no more than was to be expected from an infected herpes. But the persistence of the lesion struck me as unusual. The evolution of herpes is rapid; the individual lesions disappear in a day or two; and if there are any there in a week's time, they are new ones. The tumefaction of an infection should be progressive. These lesions had remained unchanged for seven days. These considerations made me suspicious that there was something behind the apparently simple lesion.

Seven days later the patient's condition was as shown in Figure 4. The individual erosions had fused into one; removal of the crust showed a superficial loss of tissue that was no longer herpetiform in character. Though the subjacent induration had not increased or changed in any way, it was evident that the condition was not what I had at first supposed. A probable diagnosis of initial lesion was made, though there were as yet absolutely no corroborative symptoms.

By the third week all doubts were set at rest. The labial lesion had not changed much; it was still an insignificant, non-character-



Fig. 4. Herpetiform Chancre of the Lip.



Fig. 5. Seborrhœa of the Lips.

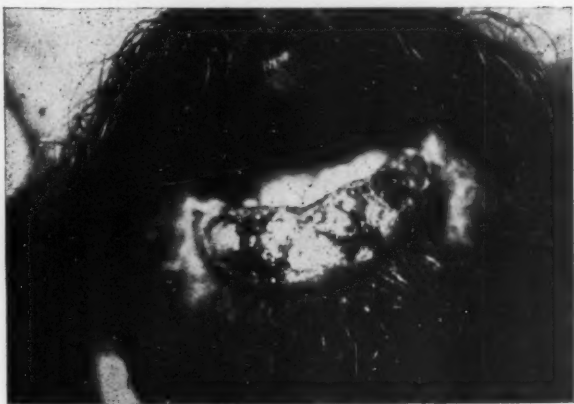


Fig. 6. Seborrhœa of the Lips.

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istic, small doughy induration, with eroded surface, and gave the patient no trouble at all. But he felt sick, had a temperature and headache, there was a characteristic angina, and a general adenopathy was beginning. Shortly thereafter he developed a sparse but perfectly distinct roseola.

This case was a lesson to me, and I have had several like it since. Here was a typical herpes of the lip, differing in no appreciable way from lesions that we see every day in the week. The only thing peculiar to it was its persistence. Since then I have always felt some little hesitation in making an absolute diagnosis of herpes on first seeing a case. Not only may a herpetic sore become infected, and later on present indubitable evidences of the presence of the syphilitic virus; the chancre itself may show only the appearance of a simple herpes in the beginning. On the genitals, next to the lips the commonest site of herpes, and the usual seat of the initial lesion, differentiation may be no less difficult.

Cases 5 and 6. *Seborrhoea of the Lips.* (Figures 5 and 6.)

A dry, scaly and chapped condition of the lips is not uncommon in children; it is generally regarded as eczematous, but is really more a seborrhoea than an actual catarrhal inflammatory condition. Sebaceous glands do occur in the buccal mucosa; and the disease that is known by Fordyce's name, and which is characterised by the occurrence of small buff-colored or yellowish masses in the mucosa, is apparently due to retention cysts of these structures.

Mild cases of seborrhoea of the lips (Fig. 5) show slight redness and swelling of the exposed mucosa, more or less accumulation of fatty scales, and some tendency to fissure formation. The dryness and scaliness of the lips is a constant source of irritation to the child, who attempts to keep them moist and soft by licking. Hence most of these cases show an orbicular zone of seborrhoeal eczema extending from a line or two to half an inch or more all around the mouth. The absolutely sharp margin of this seborrhoeal zone frequently shows has led to the supposition that the affection is fungoid, or bacterial in its nature. But the morococcus of Unna and the organisms described by Saboureaud and others have not yet been definitely accepted as the etiological factors in seborrhoeal eczema; and we must be content to regard seborrhoea as a functional affection of the sebaceous glands associated often with more or less eczematous inflammatory reaction.

The same remedies that are employed in seborrhoeal eczema of the general integument are efficacious in ordinary cases of seborrhoea of the lips. The difficulty lies, however, in their application, since it is very disagreeable to apply the ordinary oily and fatty menstrua to the lips, where they necessarily get into the mouth. It is objectionable also, to use remedies like tar or ichthyol in this location, on account of the discoloration that they occasion. Thiol is a tar-like synthetic preparation that has neither the intense color nor the disagreeable odor. In a 5 to 20% watery solution it can be painted over the lips several times a day; if it is desirable to prevent its too rapid drying, this can be affected by the addition of more or less glycerine to the preparation. Resorcin and tannic acid, alone or together, in 1 to 5% solutions can be used in the same way.

The case is different with the severer and rarer instances of the disease, where the affection has lasted for a long time (Fig. 6). Here the mucosa is thickened and pale, covered more or less with semi-adherent scales, and showing evidences of the tissue changes due to a low-grade chronic inflammation of long standing. The case shown in the illustration had had the affection for many years. Here we shall not be able to do without the fatty applications, for they permit the medication to be brought into much more intimate and prolonged contact with the affected area than do watery solutions. Pure white vaseline is perhaps the least objectionable one to employ; and though as a general ointment basis vaseline is to be condemned, its odorlessness, tastelessness, and the absence of the possibility of rancidity render it useful for applications in this locality. Sulphur, resorcin, and tar are the drugs to be incorporated in it, and they must be used strong. Resorcin 10%, sulphur 15%, and tar 20% are not too great proportions. This case was subjected to various forms of treatment for a long time in vain, and was finally nearly cured (I lost sight of him then) by a naphthol 5%, sulphur 15%, vaseline ointment.

(Serial Paper—Third Part.)

Case 7. *Heredito-syphilis of the Lips.* (Figure 7.)

This patient was a boy of 3 years who was brought to the clinic on account of an eruption of the lips that had been present "off and on" for some time. It was not possible to obtain a very definite history from the relative who was with the child; the father and mother were said to be healthy; and the child himself had not suffered from any of the manifestations of hereditary lues until the present eruption on the lips appeared.

The patient himself showed none of the ordinary stigmata of hereditary syphilis. There were no opacities of the cornea and no deafness; the teeth were of the temporary set, and could not, of course, show the characteristic deformity of the upper central incisors; there were no lesions or scars elsewhere and the child was fairly well developed. But the lips were the seat of a chronic infiltration that involved almost the entire upper one and the central portion of the lower. The infiltration was red, moderately hard, and fissured in places, more especially in the upper lip; and in the skin below the lower central tumor was a small tubercular mass exactly similar in appearance and consistency to the infiltrations of the lips.

The diagnosis at first was necessarily a matter of doubt. The tumors resembled in some degree the excrescences of a bromide eruption, though I could not ascertain that the patient had been taking any medication recently. He was therefore given a placebo internally and a boric acid solution to apply to the lips. Under this medication or rather absence of medication, there was little change in the local condition for a number of days. The fissures improved a little, or got worse and bled a little, apparently in response to the amount of local irritation to which they were subjected. The tumor masses remained unchanged.

One day, however, the relative who came with the child said that he appeared to have pain in eating. An examination of the oral cavity was made with the utmost difficulty, for the child resisted all attempts to open its mouth on account of the pain that it occasioned. I found, however, two characteristic lesions, one on the under surface of the tongue and one on one of the fauces; they were undoubted mucus patches. This made the diagnosis of heredito-syphilis evident; and the results of treatment justified the diagnosis. Under grain doses of gray powder internally, and a

10% solution of the oleate of mercury in oleic acid to the lips improvement was very rapid; in three weeks the boy was apparently cured. It was quite useless to tell his people that he was not cured, but only relieved; they were satisfied when his lips were restored to their normal condition, and I did not see the patient any more. It is necessary in these cases to apply the local mercurial in an oil or fat, so that the disagreeable taste discourages licking of the lips.

Case 8. *Chancere of the Tongue.* (Figure 8.)

This case well illustrates the fact that syphilis is not infrequently acquired and runs its course without the patient's knowledge; and we physicians sometimes help in misleading the patients by laying an absolutely unwarrantable amount of stress upon such factors as the patient's history and surroundings in making our diagnosis. She was a young girl of respectable family who was brought to me by her physician on account of her sore tongue. A glance at the organ was almost sufficient for a diagnosis; and the photograph (Fig. 8) is almost as characteristic. At the very tip of the tongue was a deep, ragged erosion, not painful, and seated on a typically indurated base. There was besides a characteristic sub-maxillary adenopathy, bilateral on account of the central position of the lesion; and she had a macular eruption, faint traces of which were visible on the face. Yet her physician at first refused to listen to the diagnosis; it was impossible that a girl of 17 in her position should have an infection of this kind. I convinced him, however, before he left my office, that such was indeed the case. To be able to carry out the requisite treatment it was necessary to take the parents of the young lady into our confidence. She went through a thorough mercurial course for over three years; and she is now long married, has healthy children and has had no relapse of her trouble.

Case 9. *Black Tongue.* (Figure 9.)

The only case of this disease that I have ever encountered occurred in a boy of 2 years, and had been present for about a year. There was a dark black streak down the center of the dorsum of the tongue, extending from just in front of the circumvallate papillae almost to the tip. It was about three-quarters of an inch in width narrowing down as it approached the end of the organ. The black streak was slightly elevated; its surface was smooth,



Fig. 7. Heredo-Syphilis of the Lips.

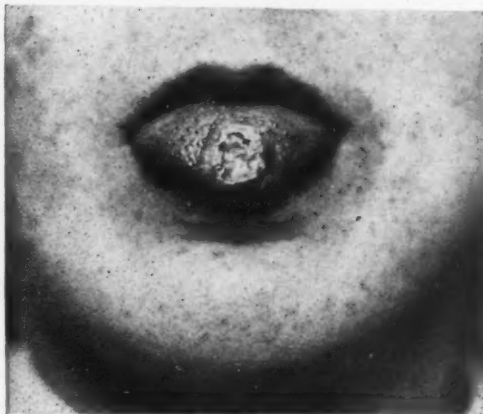


Fig. 8. Chancre of the Tongue.



Fig. 9. Black Tongue.



and looked gelatinous; and there were none of the papillary excrescences that have been noted in a number of these cases, and which has led to the designation of the condition as black hair tongue.

Of course, the first thought was of an accidental discoloration by food or medicine. If there was any reliance at all to be placed in the history, this was impossible, since the condition had been present for a year. The sharp limitation of the discolored area to the center of the tongue was against this supposition also.

Scraping the discolored area did not remove the stain; it was evidently deep in the mucosa. The scrapings contained larger visible fragments, which were found under the microscope to consist mostly of large rounded or oval spore-like bodies, with of course, epithelial cells and detritus. These bodies had a slight grayish color under the lens; and they were undoubtedly the cause of the peculiar discoloration.

A good deal has been written about black tongue; the reported cases must number now about 100. The fungi that I found have been seen in almost all of them. But papillary hypertrophy has been a marked feature in most of the cases, and many of the authorities regard the cases as instances of hyperkeratosis of the lingual papillae with pigmentation. In other cases, however, as in mine, the papillary hypertrophy has been entirely absent, and the pigmentation has been the only evidence of disease. The parasite is the mucorhyzopodiformis.

The affection is quite harmless. My case recovered in about a week under a mouth wash of a saturated solution of the hypsulphite of soda.

(To be Continued.)

Permanent Bone Defect after Mastoid Operation. GERBER.

Arch. f. Ohrenh., Leipzig, October, 1904.

A girl, 8 years old, was operated upon for mastoid disease, and the entire sinus was laid bare, together with a large area of the dura over the middle fossa. The wound cicatrized, but the bony defect remained.

YANKAUER.

ACUTE OSTEOMYELITIS OF THE TEMPORAL BONE; WITH REPORT OF CASES.*

BY WM. R. DABNEY, M.D., MARIETTA, OHIO.

In writing of the history of acute osteomyelitis of the cranial bones, Von Bergman says as follows: "Acute osteomyelitis, called spontaneous, occurring in the long bones of children and young people, was well known for some time before it had been observed and described in the flat bones. Attention was directed to the latter by the observations of disease of the ilium and scapulae which had been erroneously described as periostitis of these bones. This so-called periostitis was found most extensively developed at places where the periosteum was least abundant, as for example, when tendons were directly inserted in thick layers of spongy substance.

"Although Chassaignac reported the history of a case that was undoubtedly one of acute osteomyelitis, and Jaymes collected observations on 15 similar cases, Lannelongue was the first to offer positive evidence of the occurrence of the disease in the flat bones of the skull."

As to whether we can have an osteomyelitis of the flat bones, depends very much on what we mean by bone marrow. If we mean simply the soft substance that is contained in the central canals of the diaphyses of the long bones, then it would be impossible to have an osteomyelitis of the flat bones.

Ferguson in his work on "Normal Histology and Microscopical Anatomy," gives the following definition of bone and bone-marrow: "Bone is a firm calcareous tissue which is found only in the skeletal system. In the flat bones it forms a double layer of dense bony tissue between which is a narrow space, bridged across at frequent intervals and thus subdivided into a number of compartments, the *marrow cavities*. An Haversian System contains a small central canal which is occupied by connective tissue, *marrow cells* derived from the marrow cavity during the process of development, small blood vessels, nerve fibers and perivascular lymphatics.

"*Bone marrow* consists of a variety of connective tissue which is rich in fat cells and blood vessels and which also contains osteo-

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genetic and hematopoietic elements, the *marrow cells*. According to the relative proportion of these elements, marrow is said to present two types, the yellow and the red marrow. The yellow marrow consists almost entirely of fat, with only occasional bands of true marrow tissue. The red marrow contains very little fat, but is so abundantly supplied with blood and marrow cells as to closely resemble a very vascular lymphoid tissue. The embryonic medulla of all bones contains fetal red marrow, but in later life the larger masses in the medulla of the shafts of the long bones is in man, changed to the yellow variety. The red marrow, however, persists in the epiphyses of the long bones and in cancellous bone generally; it is especially characteristic of the marrow cavities of the ribs, vertebrae, *base of the skull*, and the sternum.

"Red marrow consists of fibrous and reticular tissues which are infiltrated by marrow cells and richly supplied with small blood vessels. The smaller veins possess exceedingly thin walls; in fact, these are so delicate that it is almost impossible to determine whether or not their epithelium, as also that of the capillaries, may be occasionally absent, thus placing the blood stream in direct communication with the pulp of the bone marrow."

Bichat defines the medullary system as being the bone-marrow and its membranes. He distinguishes two species of medullary systems: the one occupies the cellular tissue at the extremities of the long bones and that of the flat and short bones; the other is found merely in the central canal of long bones (Dunglison's Medical Dictionary).

From the above description of the microscopical anatomy of the medullary system and bone-marrow, we can readily see how it is possible to have an osteomyelitis of the scapulae, the ribs, and the cranial bones.

As the idea of spontaneous suppuration was long ago exploded by the advent of bacteriology, we cannot account for an acute osteomyelitis in this way. Acute osteomyelitis of the cranial bones occurs secondary to abrasions and lacerations of the scalp, to gunshot wounds of the head, to compound fractures of the skull, and last but not least to a purulent otitis media, whether it be acute or chronic.

The infection in osteomyelitis is a hematogenous one, and the microorganisms are either taken directly into the blood at the seat of injury, or they may be carried by the blood stream from a

suppurative process situated in a far distant organ and deposited in the bone-marrow at a point of least resistance and give rise to the violent symptoms that are seen in an acute manifestation of this disease.

If we remember the histology of the veins of the bone-marrow, we can understand how easy it is for these microorganisms to get into the bone-marrow when they have entered the blood stream.

The infection in the majority of these cases is due either to the streptococcus or the staphylococcus; or it may be due to the micro-organism of the disease from which the patient is suffering at the time the osteomyelitis is manifested, such as typhoid fever and pneumonia. When the infection is of streptococcic origin, the destruction of bone is rapid and metastasis is usually seen early; when due to the staphylococcus the destruction of bone is more extensive, but it does not break down so rapidly and metastasis is not seen so early.

The symptoms of an osteo-phlebitic-pyaemia that are seen in these cases are due to a septic thrombo-phlebitis of the small vessels of the Haversian system. These septic thrombi disintegrate and small particles become detached and are carried into the general circulation as septic emboli, these emboli are carried onward by the blood stream until they enter a capillary that is too small to admit of their further passage and they then form the nucleus of the metastatic abscesses that are developed during the course of an acute osteomyelitis.

Unless the large venous sinuses of the dura mater are involved, it is seldom that we see in these cases, metastatic abscesses in the large viscera of the body, such as the lungs, the liver, the kidneys and the spleen, as the vessels of the Haversian system are so small that the septic thrombi which are formed in them become detached in minute particles which readily pass through the large capillaries of the abdominal and thoracic viscera and find lodgment in the smaller capillaries of the pleura, the peritoneum, and the superficial tissues of the body; thus we can at once comprehend the pathogenesis of pleural empyema, septic peritonitis and superficial abscesses that are seen in these cases.

Owing to the close proximity of the cranial bones to the venous sinuses of the dura mater, an osteomyelitis of these bones is of much more serious import than when this disease occurs in the bones of the extremities.

Many authorities tell us that septic thrombosis of the sinuses of the dura mater occurs in consequence of the contiguous relationship of these sinuses to the temporal bones. If this be true, then we could not have either a septic or a non-septic thrombosis of these sinuses unless the inner table had become the seat of a destructive osteitis, either macroscopically or at least microscopically. We see cases of mastoiditis in which at the time of operation the inner table appears to be healthy, but within a few hours we have to re-operate for a septic thrombosis of one or more of the dural sinuses that are contiguous to the temporal bone, and in many instances at this second operation we would find the inner table to be in a normal condition. In a number of cases I have had microscopic examinations of chips of bone that were taken from the inner table when the sinus was being uncovered to liberate a septic thrombus, and not infrequently these chips of bone were found to be healthy.

How are these serious intercranial complications which follow so closely the initial symptoms of an acute osteomyelitis of the temporal bones brought about if they do not owe their origin to the contiguous relationship of these structures? I think that this can be easily answered; there is a rich anastomosis between the vessels of the pericranium, the cranial bones and the dura mater, in fact, many of the veins of the scalp, the mastoid and the tympanic portions of the temporal bones pour their blood directly into the dural sinuses: if these veins once become the seat of septic thrombi, it is easy for us to see how the sinuses of the dura mater may be thrombosed when the inner table has not been involved in the inflammatory process. We can also see how it is possible to have a primary thrombosis of the jugular bulb when the purulent inflammation is confined to the tympanic cavity, and it is only due to the resisting forces of nature, that we do not see this complication oftener when we consider the procrastinating tactics that are often adopted in the treatment of a purulent otitis media.

Macewen says "If the inflammatory process be sufficiently acute, the small vessels of the mastoid will become thrombosed and the plugs that are in the mouths of these vessels will protrude into the sigmoid or other sinuses that are in proximity to the temporal bone and thus we will have the starting point for the formation of a thrombus in these sinuses." Macewen in making this statement was but voicing what is regarded to-day as a part of the pathology of acute osteomyelitis.

The plugs that are in the mouths of the vessels that are tributary to the sinuses of the dura mater, may become detached and carried into the general circulation. If these detached particles have been previously infected, we will have manifested the symptoms of septicæmia (perhaps to a lesser degree) that is seen when a septic clot in one of the large venous sinuses disintegrates and is carried into the general circulation. On account of this fact, I hesitate to give an unqualified opinion that we have to deal with a septic clot in one of the venous sinuses of the dura mater unless the symptoms of the latter are well defined. The cases that manifest symptoms of sinus thrombosis that are operated upon for this condition and in which we fail to find a thrombus can be accounted for in the manner just mentioned.

In an acute osteomyelitis, the arteries as well as the veins of the Haversian system become thrombosed and the bone thus being deprived of its nutrition breaks down rapidly. On account of this thrombosed condition of the arteries, the post-operative repair of the affected part is slow.

The subperiosteal abscesses that are seen in an acute osteomyelitis of the temporal bone are not always due to a dissecting up of the posterior membranous canal wall by pus burrowing under it, or to an escape of pus through the Rivinian notch, or in children to an escape of pus through the squamo-mastoid fissure; but they may be due to a septic thrombo-phlebitis of the vessels that pass between the periosteum and the bone; as when these vessels have septic thrombi formed in them, if ulceration of their walls does not take place and infect the periosteum and cortex of the bone, the micro-organisms made by a process of diapedesis migrate through the walls of the vessels and thus infect the surrounding tissues. Any operative procedure that is adopted in a case of subperiosteal abscess consequent to an acute osteomyelitis must compass an opening of the bone and a thorough removal of the broken-down medullary tissue, or the operation will be worse than useless as such an operation subjects the patient to the risks of an anesthetic without eradicating the underlying pathological condition that is the etiological factor in the production of the subperiosteal abscess. Furthermore, metastasis goes on which sooner or later in the majority of the cases claims the life of the patient; or if he does not succumb, the condition becomes chronic and he is subjected to the risks and dangers of a chronic septic infection.

As the dura mater acts as an endosteum for the cranial bones, we are just as likely to have an extradural abscess as we are to have a subperiosteal abscess in an acute osteomyelitis of these bones. The pathology of these extradural abscesses is the same as that of the subperiosteal ones that have been referred to.

In my earlier operations for acute osteomyelitis of the temporal bones, I made the mistake of not opening the inner table and searching for an extradural abscess, and to my chagrin I would have to open the inner table shortly after the primary operation on account of symptoms of pus retention within the cranium.

The extradural abscesses were usually found between the inner table and the sigmoid sinus, constituting what are known as perisinuous extradural abscesses. The subdural abscesses were usually found above the roof of the tympanum or antrum.

The ear may or may not be discharging at the time we are called to see the patient, but we are told that the patient has had a severe chill, that was followed by a rapid rise of temperature and pulse. The pulse rate may be out of proportion to the rise in temperature, varying from 140 to 160 per minute, while the temperature may not rise above 102°F. or 103°F. The tongue is heavily coated and the spleen becomes suddenly enlarged; the respirations are increased and embarrassed. This symptom taken in connection with the initial chill and the rapid rise of the pulse and temperature, might lead one to mistake the true condition for pneumonia.

If the true condition is not recognized early, and if the patient does not succumb before he receives the prompt surgical treatment that is indicated in these cases, he becomes weakened, excitable and irascible; he loses flesh rapidly and sinks into a typhoid state; the general senses are impaired; there is mild delirium and stupor; the abdomen is distended; the pulse is rapid, infrequent, and easily compressed; the stools may assume a typhoid appearance and an eruption similar to that of typhoid fever may appear on the abdomen and thorax. If you will examine these red spots closely, you will find that they do not disappear on pressure, that they are not elevated above the surface, and that they have not recurred in successive crops.

Typhoid fever can be excluded by means of the Diazo and Widal tests, and it may also be excluded by the white blood count, as in uncomplicated cases of typhoid fever, the white count will be normal, while in acute osteomyelitis the white count will be greatly

increased. It may reach twenty or thirty thousand, and if there is a disintegrating septic clot in one or more of the sinuses of the dura mater, the polynuclear leucocytes may be increased up to 95%. When an acute osteomyelitis enters the subacute stage and assumes the appearance of typhoid fever the less hopeful is the prognosis.

Pain is a constant symptom and is manifested early; it is situated either at the point where the nutrient artery enters the bone, or at the site of the primary infection in the bone, which is usually the antrum, in an acute osteomyelitis of the temporal bone that is consequent on a purulent otitis media.

In acute osteomyelitis of the temporal bone, the infection is disseminated rapidly as a rule, and we have areas of apparently healthy bone situated between areas that have undergone necrosis. On account of these widely distributed areas of necrosis, there will be points of tenderness on pressure other than where the nutrient artery enters the bone.

Septic phlebitis and thrombo-phlebitis of the mastoid veins are quickly developed in these cases, and consequently points of tenderness on pressure will be found early where the mastoid emissaries and the veins that are tributary to the dural sinuses enter the bone.

The pain is described as being excruciating and of a deep boring character and increases in severity until necrosis of the inner or outer table takes place and allows the pus to escape into the soft tissues that are in relation with the bone. When this occurs the pressure is released and the acute pain is abated for the time, but it returns as soon as sufficient time has elapsed for tension of the soft parts to take place from the increasing purulent exudate.

If the outer table is thin or if it is of moderate thickness, redness of the skin and swelling of the overlying soft structures will be an early symptom as the periosteum soon becomes involved. When the outer table is of unusual thickness or has become eburnated through a process of rarefying osteitis, these symptoms are not seen early, as they are not manifested until the periosteum has been invaded through a septic thrombo-phlebitis of the communicating vessels.

In the majority of these cases, the inner end of the posterior-superior membranous canal-wall will be found to be sagging and boggy. While this is the rule, it is by no means constant, as the anatomical conditions that are productive of this symptom are not always present in a given case.

If we consider the aural discharge that is present or the history of a discharge from the ear in the past, with the other symptoms that are manifested, we should not have much trouble in arriving at a correct diagnosis; but we all hear of cases dying every year in which the "running ear" was not thought of sufficient importance to merit consideration as a possible etiological factor in the fatal termination of the case.

The prognosis in an acute osteomyelitis of the temporal bone is very grave unless it is recognized early, and prompt surgical measures adopted, as the patient may die within twenty-four to seventy-two hours from the onset of the symptoms, the system being overwhelmed by the rapidly generated toxins.

The treatment of these cases is essentially surgical, although the medical side of the case should not be lost sight of.

Case I.—Miss C. Age 24 years. This case was referred to me by Dr. Harry Curtis, March 17th, 1900.

History.—Heredity—Negative. Personal, she had an attack of "Grippe" about four weeks ago and during the latter part of the attack an acute otitis media was developed in the right ear; the ear only discharged slightly and ceased to discharge several days ago. She had a severe chill at two o'clock this morning; the chill was followed by a rise in temperature and profuse perspiration.

Present condition.—12 A. M., March 17th. Temp. 97.5° F.; pulse 120, thready and intermittent; skin is sallow; abdomen is slightly distended, and the spleen is enlarged.

She locates the pain in the mastoid, and pressure over the antrum and tip as well as at the point where the emissary vein enters the bone produces severe pain. There is swelling over the mastoid and upper third of the neck, and the skin is quite red.

The perforation in the drum has closed and the inner end of the postero-superior membranous canal-wall is not sagging; the membrane is only slightly congested and is not bulging.

An operation was proposed but this was rejected, the family stating that they would rather wait a day or two before having any "cutting" done.

March 18th, 10 A. M. The patient was very restless during the night and had a chill at 4 A. M. Temperature is 105° F. Pulse 140, weak and intermittent. Respirations 36, and somewhat jerky in character. The pain had increased in severity and the mastoid and cervical edema was more pronounced.

Operation was again proposed and the consent of the family obtained.

The patient was taken to a hospital and chloroform administered at 3 P. M. When the periosteum was incised, quite an appreciable amount of bloody serum was set free. When the outer cortex was opened, pus and granulations were found scattered about the mastoid and the zygomatic cells. The inner table over the vertical portion of the sigmoid sinus was removed, as it was thought from the violent symptoms that were manifested that we had to deal with a septic thrombus in the sigmoid sinus. Such did not prove to be the case, but a small extradural abscess was discovered at this point. The wound was irrigated with a 1 to 3000 solution of bichloride of mercury and 75% alcohol and packed with iodoform gauze strips.

This patient's temperature did not rise above 100°F., and that was on the day succeeding the operation. When this rise in temperature was noted, the wound was immediately dressed, after which the temperature became normal and remained so.

I wish to call your attention to the fact that this case manifested all of the cardinal symptoms that are laid down in the books as indicating a septic thrombosis of the sigmoid sinus; yet, when the patient came to operation, such a condition was not found.

Was the small extradural abscess that was present in this case responsible for the alarming symptoms that were manifested, or were they due to the rapid absorption that was taking place from the septic thrombi in the mastoid vessels? I am rather inclined to accept the latter view.

Cases of the character of the one just reported, only show us that we cannot be too positive as to whether we have to deal with a septic thrombosis of one or more of the dural sinuses, until the skull is opened, and in not a few instances, until the sinus in question is opened.

Case 2. White male, age 22 yrs. This case was referred to me January 26th, 1904, by Dr. A. Howard Smith, who stated that he had been treating the young man for several days for a streptococcic tonsilitis and that, on the 24th inst., the patient began to complain of severe pain in the right ear. The drum had ruptured on the following day but the pain was only alleviated for several hours, when it began to increase in severity and was referred to the mastoid region.

Patient had a severe chill several hours before I saw him and was sweating quite freely at the time of my visit.

Previous aural history negative.

Present Condition.—Temperature 101°F.; pulse 120, irregular and easily compressed. Respiration 24.

The right tonsil is covered with a grayish-white exudate that can easily be detached and does not leave a denuded bleeding surface. A swab was taken from the throat and streptococci were found.

There is some swelling over the mastoid and the integument presents an intensely glazed appearance. A copious flow of sero-sanguinolent fluid is coming from the middle ear through a perforation in the infero-posterior quadrant of the drum membrane and there is some sagging of the inner end of the postero-superior membranous canal wall; a slight pulsation is imparted to the discharging fluid as it comes through the perforation in the drum.

After cleansing the external auditory canal, a smear was taken from the discharge as it came through the perforation in the drum. This smear was handed to Dr. Smith and he reported that streptococci were found.

A calomel purge was ordered, to be followed by a bottle of Red Raven Water, and an ice bag was applied to the mastoid. The nurse was ordered to irrigate the ear with a hot 1 to 5000 solution of bichloride of mercury every two hours.

January 27, 7 A. M. Temp. 99°F. Pulse 100. The nurse stated that the patient had been very restless during the night, and that he complained a great deal of pain in the mastoid. The swelling of the tissues over the mastoid had increased, and the post-auricular groove was obliterated. There was marked increase in the tenderness on pressure over the mastoid tip and antrum and the inner end of the postero-superior membranous canal-wall was sagging to a greater extent than it was the previous evening. Ophthalmoscopic examination was negative.

The patient was advised of the necessity of an early operation; his consent was obtained, and he was sent to a hospital and prepared for an immediate operation.

The bone was exposed in the usual manner, and when the periosteum was incised a small amount of pus escaped. The outer table was opened with a gouge and mallet; the cortex was very thin in this individual, and pus flowed out of the cells when the first chip of bone was removed. There were numerous areas of carious bone,

pus and granulations throughout the mastoid, extending into the middle root of the zygoma and into the cells of the occipital bone.

After thorough curettage, the wound was packed with iodoform gauze strips and an outer dressing of plain gauze applied.

January 28th. Called at 8 A. M. and found that the patient had had a slight chill at 2 A. M. and that there had been a rather low but rapidly fluctuating temperature during the night.

Sinus thrombosis was suspected and the young man was taken to the operating room and chloroform administered. The sigmoid sinus was exposed in its vertical portion. On removal of the inner table, a small quantity of pus was set free, and it was seen that the sinus wall was beginning to ulcerate, but a palpable clot could not be detected.

While the sinus was being uncovered in the direction of the jugular bulb, it ruptured at the lower margin of the ulcerated portion and there was a free flow of blood. Hemorrhage was controlled by packing iodoform gauze strips against the wall of the vessel.

January 31st. Temp. 99°F. Pulse 84. The dressing was taken off and the wound was in a healthy condition.

February 8th. Patient's condition has been all that could be desired until to-day when he began to complain of pain and tenderness along the lower third of the sterno-cleido-mastoid muscle; there was also a slight amount of edema in this region. There was a gradual increase in the pain, tenderness and edema in this region until the morning of February 15th, when a distinct fluctuation was elicited in Zang's space. During this time the temperature was not above 99°F., nor the pulse above 80.

Under chloroform anaesthesia an incision was made into the space between the sternal and clavicular attachments of the sterno-cleido-mastoid muscle and an ounce of pus was set free. This pus was found to contain streptococci. The mastoid wound was inspected and a small area of carious bone removed.

From this date, the patient made an uninterrupted recovery and was discharged as cured at the end of nine weeks from the date of the primary operation.

In this case, I wish to call your attention to the rapidity with which the mastoid was invaded following so closely as it did upon the initial infection of the middle ear, and to the great destruction of tissue that had taken place in so short a time, as only four days had elapsed since his ear began troubling him.

I also wish to call your attention to the low temperature during the night following the primary operation, notwithstanding the serious intra-cranial complication we had to deal with later.

I think that the chill and temperature variations during the night succeeding the primary operation were due in part to a dislodging of the septic plugs that were in the mouths of the vessels in the mastoid that are tributary to the sigmoid sinus. These septic plugs may have been set free by the manipulations that were essential to the operation on the mastoid.

Here is a case where it would not only have been the height of folly, but it might have meant the loss of valuable time and the life of the patient would have been seriously compromised, if the abortive plan of treatment had been prolonged.

Case 3. German American. Age 51 yrs. I saw this case in consultation with Dr. R. W. Athey on the morning of January 31st, 1904.

History.—About six weeks ago the patient had an attack of La Grippe which was complicated by a purulent otitis media in the left ear, and the ear had been discharging profusely since this time.

For the past three days, he has had considerable pain in the mastoid accompanied by more or less supra-orbital pain.

He had a severe chill the day before he came under my observation. On the third day before I was called in consultation, Dr. Athey noticed that the mastoid region was becoming edematous.

Present condition.—Temp. $101\frac{3}{5}^{\circ}\text{F}$. Pulse 130. Respirations 28. The face has an anxious drawn expression and the skin and conjunctiva are of the color of saffron; the tongue is heavily coated and the breath is foul. The abdomen is distended; the spleen is enlarged and the bowels have been constipated for the past ten days, although previous to this time there was marked diarrhoea.

There is a marked edema over the mastoid; this edema extends upward to the vertex, backward to the occiput, forward over the temporal fossa and articulation of the inferior maxilla, and downward on to the neck. He complains of pain over the entire left side of head and says that the pain is noticed most at night. The integument of the edematous region, has a red glazed appearance not unlike an erysipelatous blush.

The slightest pressure applied over the site of the antrum produces exquisite pain; the mastoid tip as well as the points where the blood vessels enter the bone are very tender to pressure.

Percussion on the affected side of the head increases the general head pain. There is a free discharge of thick yellow pus from the middle ear. The external auditory canal was thoroughly cleansed, and a large perforation was seen in the lower anterior quadrant of the drum-membrane. A smear was taken from the pus as it came through the perforation in the drum, and was found to contain staphylococci. The inner end of the postero-superior canal-wall was not sagging much, there being only a slight interruption of the angle between the drum and the membranous canal. He complains of a dull aching pain in both eyes and they are sensitive to light. Pupils are moderately dilated, and they are sluggish to light and accommodation. Ophthalmoscopic examination was negative. There was a slight horizontal nystagmus as well as vertical subjective vertigo.

The patient's consent was obtained and he was sent to the hospital to be prepared for operation the following morning.

February 1st. The anesthetic was started at 9 A. M., and the patient did not take it kindly as he has been quite a liberal user of alcoholic beverages.

An incision was made down to the bone and quite a large serous subperiosteal effusion was found. The bone was opened with a gouge and mallet, but pus was not encountered until we had almost reached the antrum, as the cortex in this individual was very dense and thick.

When the antrum was opened, about four drams of thick, creamy pus was set free; this pus contained staphylococci.

The inner table overlying the vertical portion of the sigmoid sinus and the superior and posterior walls of the antrum were completely eroded. The outer wall of the sinus and the exposed dura of the middle fossa were covered with a thick mass of granulations. As these granulations did not appear to be healthy they were trimmed off with small curved scissors.

As this was a diploetic mastoid a large number of small disseminated abscesses were found in the subcortical cells of the tip, in the cells above the external meatus, in the middle root of the zygoma, and in the cells in front of the glenoid fossa.

The wound was irrigated and dressed in the usual way.

There was a slight rise of temperature following the operation, but it immediately declined after the wound was dressed.

This patient made an uninterrupted recovery and was discharged six weeks from the date of operation free from nystagmus and vertigo.

I think that case is a typical one of acute osteomyelitis of the temporal bone due to a staphylococcic infection. The destruction of bone was rather slow but it was very extensive. The patient had only one severe chill, but there were a number of slight rigors, and these taken in connection with the rapid and feeble pulse, would have justified one in suspecting a sinus thrombosis, and I would have laid open the sinus and searched for a thrombus if the failing vitality of the patient had not precluded such a procedure.

These cases should be dressed often for if they are allowed to go until the outer dressing is soiled, they will re-infect themselves and symptoms of absorption will be manifested.

282 Front Street.

Destruction of the Middle Ear by Chemical Caustic—Death from Hemorrhage from the Jugular and Carotid.—E. JURGENS.—
Arch. f. Ohrenh., Leipzig, October, 1904.

This interesting case, a male adult, was admitted to the hospital suffering from facial paralysis, which was followed by a profuse suppuration from the ear. Frequent hemorrhages occurred, which could, however, be controlled by tampons. There was no pulsation, the blood evidently coming from the sinus. The entire soft parts of the canal and middle ear were destroyed, and the bone was necrotic. The patient ran a septic temperature, and in spite of all the active measures which were taken, he died after about two months, from the repeated loss of blood.

YANKAUER.

A CONTRIBUTION TO THE TECHNIQUE OF THE SUBMUCOUS SEPTAL OPERATION.*

BY JOHN MCCOY, M.D., NEW YORK.

The evolution of every surgical procedure is marked by contributions from time to time, of suggestions from those who have practised it. In these contributions, the stronger points of the procedure are reiterated and thereby receive emphasis and endorsement, while for the weaker ones new suggestions are offered, which in the light of time and experience are either adopted or discarded. This in brief has been the history of the submucous operation for the correction of deviations of the nasal septum. A new incision has been added here and a new instrument suggested there, and so by a gradual process of inclusion and exclusion, gleaned from experience, we aim to secure simpler methods and better results. The comparatively recent adoption of this operation renders it still a fruitful subject for discussion. With this in mind, I venture to offer for your consideration, the following thoughts and suggestions which have come to me while operating on a series of one hundred and twenty cases. For the purpose of convenient consideration the operation itself may be divided into five essential steps. These are:—

- (1) The primary incision.
- (2) The elevation of the mucous membrane perichondrium and periosteum of the convex side.
- (3) The incision of the cartilage—to effect
- (4) The elevation of the mucoperichondrium and periosteum of the concave side.
- (5) The removal of the deviated cartilage and bone.

In the experience of the writer, the single incision, either vertical or oblique, meets all requirements, and for the following reasons has been adopted in all cases. It gives the least amount of possible hemorrhage both during and after the operation; healing is accomplished much sooner after the operation, and, with the use of appropriate instruments, we can obtain a clear view of and an easy access to the field of operation, even back to the posterior limit of

* Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, at Syracuse, N. Y., February 10, 1906.

the septum. When the anterior portion of the triangular cartilage is *dislocated* into the vestibule we must of necessity make this incision obliquely along the anterior edge of the cartilage. When the septum is *deviated* into the vestibule forming a sharp vertical angle, the writer has found it best to make the incision immediately over the angle. In all other forms of deviation the incision is made just in front of the deviation on the convex side. It is carried from the floor of the nose well above the upper limit of the deviation. It cannot be too well emphasized that this incision should be carried a slight distance into the cartilage itself, as this greatly facilitates the commencement of the second step, and insures the operator against trying to elevate mucous membrane without getting under the real perichondrium, a mistake which is frequently made by beginners. For making the primary incision the writer uses a knife* (Fig. 1) which he has devised for the double purpose of making this incision as well as the later incision through the cartilage. It has a movable blade at an obtuse angle to the shaft, the blade is sharp on all its presenting edges, and can be adjusted by the small thumb screw at the end, to cut to any desired depth.

The *second step* in the operation is accomplished by means of elevators of which many modifications have been devised. In general they are either blunt-edged for the purpose of elevating the normally adherent membrane, or sharp-edged for the purpose of dissecting free, abnormally adherent membrane. With an increasing facility of technique, the operator can elevate quite as rapidly and safely with the smaller and narrower elevators, as he can with the larger types, and moreover, he can elevate in extremely narrow places inaccessible to the larger bladed elevators. The writer uses the sharp-edged elevator of Dr. Freer and the blunt-edged elevator of Dr. Abraham.

In commencing the elevation of the membrane of the convex side, it is well to begin above and gradually work down, because as a general rule the membrane of the upper half of the septum is found to be normally adherent, whereas it is in its lower half that we usually find the abnormally firm adherences. The deviations which are apt to give us the most trouble in elevating the membrane are those where, following an old fracture of the septum, there has been formed a sharp crest, usually horizontal, over which the membrane is apt to be exceedingly thinned out, or extremely adherent because

* Described in *The Laryngoscope*, January, 1906, page 40.

of the formation of new connective tissue bands intimately connected with the septum.

Another difficult type is where there has been a preceding operation, either a spur has been removed with a saw, or an Asch operation has been performed. The cicatricial membrane over the site of the old operation, is apt to be extremely thin and sometimes firmly adherent. When the septum is deviated to a sharp vertical angle in the nose, it is better to separate up to the angle and then defer elevating behind it until in the regular course of the operation the septum is removed up to the angle. Frequently we find the membrane very adherent at the anterior part and just below a low horizontal crest.

The *third step* in the operation, the incision through the cartilage without incising the membrane of the concave side, is one of the most delicate steps in the procedure. This incision is made in the same line as the primary incision, and one must be exceedingly careful not to cut through the membrane of the opposite side, as a permanent perforation is apt to result at this point. In making this incision, the writer uses the safety knife which he has devised for this purpose (Fig. 1). The movable blade is protruded and fixed, so that it cuts to a depth of one-sixteenth of an inch; if this is found to be insufficient, the blade is advanced a fraction further, the operator feeling secure that he cannot possibly cut deeper than the depth at which the blade is fixed. The cartilage having been cut through, the blunt elevator is inserted in the cut, and—

The *fourth step*, the elevation of the concave side is begun. On this side again it is well to begin separating above, working backwards and then downwards, for we usually find the abnormal adherences either in the trough of the concavity or well down towards the floor anteriorly, so that it is well to approach these spots with as much of the necessary membrane freed as possible. Having thoroughly completed the separation of the membrane of this side, we commence—

The *fifth step*, the removal of the deviated cartilaginous and bony septum. Unquestionably the quickest method of removing the cartilage is with Dr. Ballenger's swivel knife, and in suitable cases, it should always be employed as it accomplishes this part of the operation safely, thoroughly and speedily. Before this knife was introduced, however, and at a time when the means of effecting the removal of the bony portion of the deviation was by the use of

* Described in *The Laryngoscope*, January, 1906, page 40.

Grunwald's or similar forceps, and by chisels, the writer was led to devise a forceps* (Fig. 2) with long straight blades, which would have sufficient length and yet contain sufficient strength to remove any portion of the septum, either bony or cartilaginous, whose cutting edges would be sufficiently sharp and strong to cut through bone, and whose handles would be placed in such a position as to give the operator a clear and unobstructed view as the forceps grasp the bone or cartilage to be removed. They are introduced through the anterior incision with the blades closed; the blades are then allowed to spread and thus act as dilators, pushing the separated membrane of both sides away from and giving a clear view of the septum, which is grasped by the forceps and removed piece by piece cleanly and accurately. When the deviation extends down toward the floor of the nose and includes the lower limit of the vomer and the maxillary ridge, it is extremely difficult in many cases to attack this portion of the deviation with a straight instrument. The writer has therefore adapted the straight forceps to meet this condition by modifying them so that the handle and length of the blade remain the same, but the cutting surface is limited to the tip of the forceps which is turned down three-sixteenths of an inch. These forceps* (Fig. 3) are made somewhat heavier owing to the increased thickness and density of the bone in this region. They are introduced and applied in the same manner as the straight forceps, but instead of looking along the upper edges of the blade, it is somewhat more convenient to tilt the handle up slightly and look directly at the cutting surface of the blade. Both forceps have given me great satisfaction in this work and they are therefore respectfully recommended for your consideration.

There are several conditions which we may find associated with deviation of the septum, any one or more of which may require our consideration during or after the operation. It is with a view of citing my own experience and observations in these conditions, and in the hope of eliciting discussion thereon, that I make mention of them.

On examination of a nose with deviated septum, we may find the septum deviated to such an extent that it is found in close contact with either the middle or inferior turbinate, so that we are unable to pass a probe between the septum and turbinate. The question then arises—What is the best mode of procedure in these cases? It has been the experience of the writer that we may find here either

* Described in *The Laryngoscope*, January, 1906, page 41.

a real or an apparent adhesion to the turbinate, consequently attention to the condition is deferred until we reach it in our regular mode of procedure, that is the muco-perichondrium and periosteum are separated as thoroughly as possible around the point of contact. When we come to the removal of the septum itself, we may find that it will shell out at this point, and that the membrane will swing clear of its apparent adhesion, or we may find that there is a real adhesion or synechia formed, and we are then compelled to sacrifice the membrane at the point of adhesion.

Another condition which is a very frequent accompaniment of deviation, is a hypertrophied middle or inferior turbinate. Is it wiser to dispose of a sufficient portion of this hypertrophy at the time of operating on the septum, or to defer this and subject the patient to another operation later? The writer adopts the following plan. If the turbinate is large enough to project beyond the median line, a sufficient portion of it is always removed following the septal operation. If the turbinate is not enlarged to this extent, but is enlarged sufficiently to constitute an obstruction to nasal respiration, a sufficient portion of it is removed immediately following the septal operation, unless the operation has for technical reasons been unduly prolonged, or the patient does not bear the shock of operation well, in which events it is removed at a subsequent period.

Still another condition which one meets is a circumscribed hypertrophy of the mucous membrane on the concave side of the septum which has the appearance and somewhat the action of erectile tissue. By this is not meant the ordinary hypertrophy of the mucous membrane sometimes found over spurs, but the real enlargements usually found above the horizontal mid-plane of the septum, about opposite the middle turbinate. The writer has observed it in six of his cases, in one of which the swelling was as large as the middle turbinate itself. If it is allowed to remain, it does not tend to spontaneous disappearance. In the treatment of this condition, the desire of the writer has been to efface the enlargement and at the same time preserve the surface mucous membrane. The method which has given me the best results so far, has been by means of electrolysis with parallel needles, plunging them into the enlargement at several points and using from ten to fifteen milliamperes of current. This procedure is begun a week or ten days after the operation and may have to be repeated several times at weekly intervals.

Again, there are cases in which the deviation extends up to and involves the nasal profile, so that there is an external deformity and the tip of the nose is deviated to either side. As a general rule in removing the septum, it is best not to approach the nasal profile nearer than one-quarter of an inch. In these cases the writer prefers to leave a little more than one-quarter of an inch, and after completing the submucous operation proceeds as follows: That part of the septum remaining near the profile is fractured so that the tip of the nose may be brought to and retained in the middle line. Bismuth gauze packing is then introduced in the nose, so as to retain the fractured cartilage in place. This packing is continued for about ten days, and union of the fractured fragments is then complete enough to insure permanent relief from the external deformity.

Cocainization.—The "sine qua non" of a good operation is a good anaesthetization of the field of operation. The happiest results have been secured in the following manner: First a spray of adrenalin solution 1 to 1000 is followed by a gentle swabbing of the entire field with a 4% solution of cocaine in a 1 to 4000 adrenalin solution, and then strips of cotton dipped in the same cocaine adrenalin solution are well wrung out and applied over both sides of the septum and allowed to remain there for from thirty to thirty-five minutes. In this way I find that we are not bothered with the attacks of faintness which come on during the operation when we employ the stronger solutions for shorter periods of time, nor are we compelled to resort to further applications of cocaine during the operation. When it is necessary to elevate the muco-cutaneous covering at the anterior end of the septum, the subcutaneous injection of a one-half per cent solution of cocaine adrenalin must be resorted to at this point.

The treatment following the operation is exceedingly simple. Strips of gauze impregnated with bismuth subnitrate are lightly inserted into both nostrils. These are laid alongside the septum and keep the recently elevated muco-perichondrium and periosteum of both sides apposed. The upper layers of this gauze are removed at the end of twenty-four hours. The lower layers are removed at the end of forty-eight hours. Following this the patient is given an ointment of boric acid or yellow oxide of mercury to apply in the nostril after irrigating with normal saline solution.

In conclusion the writer begs to state that many of the ideas herein expressed, are but a review of the suggestions of earlier

writers, and in this reiteration of their views, he voices his appreciation of their sterling efforts in this field of work.

Convinced of the complete efficiency of the operation in all forms of septal deviation, and of its freedom from untoward after-effects, the writer, never having seen the slightest tendency to alteration of the nasal profile, or other unpleasant sequelae, has become an enthusiastic advocate of its still more universal adoption.

157 West 73d St.

The Pharyngeal Tonsil as a Causative Factor in Systemic Disturbances. W. J. BUSSEY (Sioux City, Ia.) *Med. Herald*, September, 1905.

The author thinks it strange that affections other than hypertrophy of the pharyngeal tonsil should have been nearly entirely overlooked. He calls attention to the great amount of systemic disturbance which accompanies inflammation of this tonsil, stating that we often have an acute inflammation of the gland in children, where there is no marked enlargement, and in whom the ordinary symptoms of adenoids are wanting.

He notes that many children are subject to recurring febrile attacks, in which the temperature rises to 102 or 103, some discharge from the nose, slight enlargement of the cervical or submaxillary glands, and perhaps some cough. It may be taken for the first stage of some acute infectious disease, or the cause ascribed to some gastrointestinal disturbance.

If the post-nasal space be examined, we shall then find it filled with muco-purulent secretion, and removing this, we can see, or palpate, the more or less thickened and inflamed gland. Bussey is convinced that many cases suspected of being influenza, are in reality pharyngeal tonsillitis.

He treats the condition, during the stage of acute inflammation, by means of an alkaline spray or douche, through the nostrils, and the local application of a 25 per cent sol. of argyrol. When the acute symptoms have subsided, the gland should be removed, as these cases require surgical attention just as urgently as do those which produce symptoms of mechanical obstruction.

EATON.

**REPORT OF CASES OF SUBMUCOUS RESECTION OF THE
SEPTUM WITH CONCLUSIONS DRAWN FROM SAME.
ILLUSTRATED.***

WILLIAM WESLEY CARTER, A.M., M.D., NEW YORK.

The series of cases upon which this report is based comprises forty-five submucous operations, done in hospital and private practice since January, 1903.

My object in making this report is to record the present condition of some of these cases that are of standing sufficiently long for us to reasonably assume that their present state is a permanent one. And second, I wish to bring before you a few observations made in the course of this operative experience, and to make a few suggestions bearing upon the future of these patients, a matter that demands our most serious consideration.

Simplicity, other thing being equal, is desirable in every department of surgery, but especially is this so in doing the submucous operation, where the vision must be concentrated for some time on a narrow field. Here every unnecessary instrument and every superfluous detail is a distinct impediment to the operator. The operation should be directed entirely toward relieving the stenosis, and beyond this no attempt should be made to re-model the nasal chambers.

My technique, which has remained the same throughout, save for the introduction of a few instruments that have greatly facilitated my work, is briefly as follows:

The only instruments used besides the cotton applicators are a small scalpel, a combination curette and elevator, a punch forceps and sometimes a speculum. These instruments have all been shown at a previous meeting of the section. They meet all the requirements of the operation, except in those cases where it is necessary to remove the septal ridge and incisor crest. Here I have used with much satisfaction Dr. McCoy's down-cutting forceps.

The patient is seated in an upright position, the nasal chambers are sprayed with a mildly antiseptic, alkaline, cleansing solution such as Dobell's. The face is washed, and then wiped off with the end of a towel dipped in 1-2000 bichloride solution, and sterile towels are placed over the head and shoulders. Both nostrils are

* Read before the Laryngological Section of the New York Academy of Medicine, April 25, 1906.

sprayed with a half and half mixture of 10% cocaine and 1-1000 adrenalin solution, and pledgets of cotton soaked in this mixture are introduced. Twenty minutes are allowed, at the end of which time I assure myself that the tissues are thoroughly blanched and anesthetized. If it is considered necessary to remove the septal ridge, some of the solution is injected with the hypodermic along the base of the septum.

A single vertical incision is made through the muco-perichondrium from above down to the incisor crest, just behind the white line showing the anterior border of the septal cartilage, when the columnar cartilages are pushed away from the side of deflection.

The anterior third is elevated with the sharp curette end of the elevator, and that portion less closely attached to the cartilage is separated with the blunt end. I then come forward and scrape through the cartilage with the curette to the perichondrium on the other side, and elevate over the concave side. In elevating, I usually start at the upper end of the incision, and separating back-



Fig. 1. Author's Sharp Elevator, Blunt Elevator and Curette.

ward as far as I intend to go, with the sharp elevator, introduce the blunt end, and, pressing downward with considerable force, work the instrument forwards. I then introduce my long blade speculum into the perichondrial sac, one blade on either side of the denuded cartilage, and proceed to remove the obstructing portions of both cartilage and bone with my specially devised punch forceps. This is the best instrument for this purpose, as it removes both cartilage and bone, and since both of these structures are practically always involved in the deflection no change of instruments is necessary. The tissue is punched out and there is no tugging which might easily result in fracture of the cribriform plate, or dislocation of the upper edge of the septal cartilage where it is wedged in between the lateral cartilages, and acts as the keystone of the arch of the nose. Then too in using the forceps we can recognize, and save that portion of the cartilage not involved in the deflection. This leaves the nose stronger and more resistant to the contraction of the amount of connective tissue that always forms after the operation. The use of a speculum is entirely unnecessary

after the operation. The use of a speculum is entirely unnecessary and more often I do not use one, as the forceps are so constructed that they can be easily introduced closed, and they push the perichondrium out of the way when opened. The cartilage having been removed, I line up the mucous membrane to see that the result is satisfactory. I then spray out the nose with sterile physiological salt solution, and lightly pack both nasal cavities with vaseline gauze, prepared by placing narrow strips of plain gauze in a test tube, saturating it with melted white vaseline and then placing the tube in a sterilizer. I have found when this dressing is applied immediately after the operation that the tumefaction is less and that healing occurs more quickly and with less discomfort to the patient than after any dressing that I have used. This first and only packing is removed in forty-eight hours and the patient is instructed to introduce a liberal quantity of vaseline into each nostril twice a day and to abstain from blowing the nose vigorously. Owing to the



Fig. 2. Author's Self-Retaining Speculum.

uncertain osmotic properties of the usual watery sprays and douches none of these are advised; they only irritate the mucous membrane. The patient has usually completely recovered from the operation in ten days, the mucous membrane having resumed its normal function.

A summary of my cases is as follows:

All cases were males. In age they varied from 10 years to 57 years. Both of these extremes are beyond the age of election for the operation, but special conditions governed my actions in both instances. The other cases were all between 15 and 38 years of age. Deviation in 24 cases was to the left; in fifteen cases it was to the right; in 6 cases it was sigmoid, both sides being obstructed. In one case the anterior edge of the vomer consisted of two plates with an interval between. In two cases the cartilaginous septum was either calcified or ossified. In several cases there was distinct bulging on the side of the nose corresponding to the deflection. In all but two cases it was necessary to remove some bone.

The younger the patient, the more closely adherent was the perichondrium. The immediate results in all of my cases were very satisfactory, the symptoms caused by the deflection were entirely relieved. The majority of the patients were operated upon on Saturday or Sunday and they resumed their accustomed duties on Monday. There was one perforation. The subsequent progress of these cases I have observed by having the patients call at my office at intervals for examination. Twenty-six cases are of two years' standing or longer; of these ten have been lost sight of. These were all in satisfactory condition the last time I saw them. Of the remainder I can say that not only have the first good results been maintained, but in some, improvement has resulted from contraction of redundant tissue and the accommodation of the turbinates to the changed conditions. In most of the cases no operative scar is easily discoverable.



Fig. 3. Author's Punch Forceps.

The septa are so firm in some of the older cases that it is easy for one to believe that the cartilage has been reproduced; while in others of equally long standing the partitions are as flaccid as they were just after the operation.

In those cases where the deflected septum had caused the side of the nose to bulge, the organ now appears symmetrical. None of the cases show any signs of falling in of the dorsum. One patient received a severe blow on the nose, and called voluntarily to see if my work had been undone. I found that no damage had resulted.

All cases of deformed or deflected septa are suitable for the submucous operation, but in bad traumatic cases owing to bands of connective tissue extending from one side of the septum to the other we are apt to get a perforation. But even so, the results will probably be better than we could obtain by any other method, for we get more space and better drainage by removing the pieces of broken cartilage, for these septa are usually quite thick.

My case resulting in a perforation, was a boy of fourteen years who had been struck on the nose with a base-ball bat several years before. The septum was in what might be termed a macerated condition, and he had been unable to breathe through either nostril since the injury. The doctor who referred the patient (a member of this section) agreed with me that it was a difficult case, but we both thought that on account of the thickness of the septum a better result could be obtained by the submucous method than by any other. The boy is completely relieved of his stenosis, he has a per-

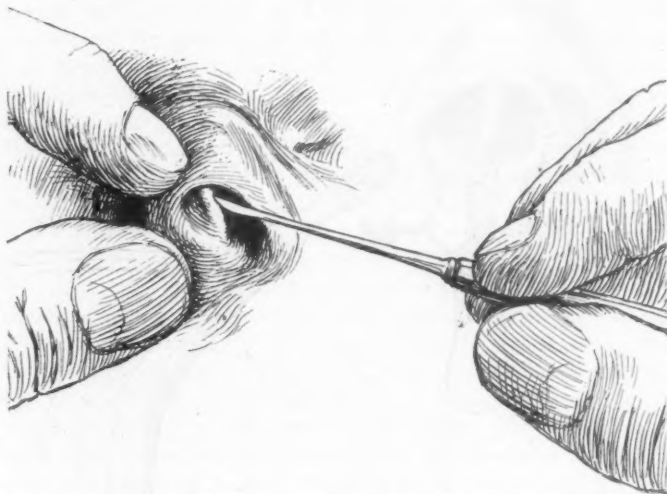


Fig. 4. Showing columnar cartilages pushed away from side of deflection. Incision is made just back of white line showing anterior edge of septal cartilage.

foration the size of a pea just anterior to the perpendicular plate of the ethmoid. It is giving him no discomfort and he is well satisfied with the operation.

A few cases met with in this series are of sufficient interest to deserve special mention. In one case, the anterior end of the vomer consisted of two plates, with an interval between. At the time I thought this was due to a proliferative periostitis resulting from trauma. On looking into the matter further, I learned that this anomaly sometimes results from faulty ossification. The vomer develops in two parallel plates, and occasionally they do not unite

leaving an interval between. In this case the septal cartilage articulated with one of the plates, the other forming a ledge-like process.

Two of my cases had marked atrophic rhinitis. In both instances it was desirable to facilitate drainage, and incidentally to permit the introduction of the catheter. In both cases the perichondrium stripped up with unusual ease and was of the consistency of soft leather. Both healed promptly and with satisfactory results. An interesting feature about these cases is that no crusts have formed

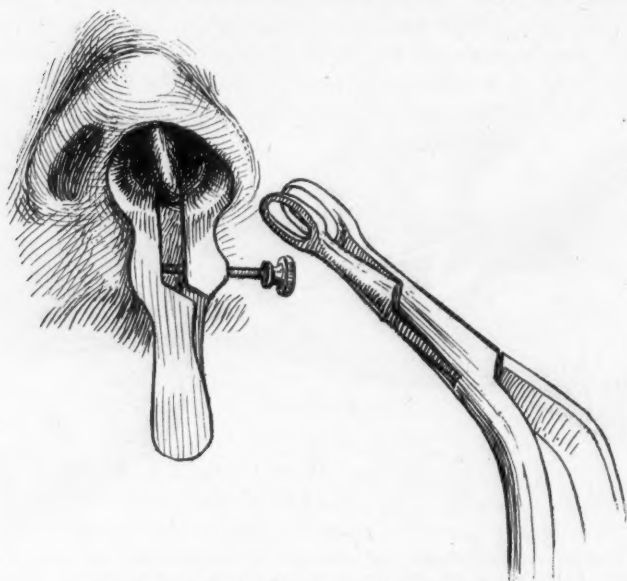


Fig. 5. Shows denuded cartilage between blades of speculum, ready to be punched out. Does not show latest improved pattern of speculum.

over the septal mucous membrane since the operation. I attribute this to the stimulus afforded the circulation by the traumatism of the operation. Another point of interest is that the cartilage was either ossified or calcified and had to be removed in small bites. This may be one of the pathological changes in the disease, as one of the patients was only 25 and the other 38 years of age, which is too young for normal senile calcification to have occurred.

In fifteen of my cases, there was superimposed on the deflection an echondrosis. In some of these cases there was a sharp hori-

zontal apical ridge, encroaching upon the turbinate. These cases are difficult because there is not space enough between the ecchondrosis and the side of the nose for the elevator to pass, and besides the mucous membrane along the apex of this ridge is poorly nourished, thin and apt to be mutilated. I have made a slight modification in my technique, that facilitated dealing with this variety of deformity. I make the usual incision, and elevate the mucous membrane below the spur and above it if I can. I then scrape through and elevate completely over the concave side. Next I introduce a pair of scissors and clip off the cartilage just above the incisor crest as far back as possible. By pushing the cartilage towards the concave side as I elevate, I have sufficient space to pass around the apical ridge with safety to the mucous membrane.

In nine of my cases, it was necessary to remove the incisor crest and septal ridge. I do not remove this, unless it is positively an impediment to respiration and the natural drainage of the nose. The septal ridge is thickly covered with connective tissue. This is absorbed to a remarkable extent after the hyperaemia caused by the cartilaginous obstruction has been relieved, so that what was a spur at the time of the operation, frequently disappears as such after the lapse of a little time. There are several objections to attacking this ridge, the chief of which is suggested by our concern for the future of these patients, and is based upon our knowledge of the later changes that occur in connective tissue. In removing the cartilaginous septum we are dealing with tissue of low organization containing neither bloodvessels nor nerves, there is no hemorrhage and little or no discomfort to the patient. But when the incisor crest and septal ridge are attacked the conditions are different. The operation is more difficult for the surgeon, more trying for the patient and we must injure the more highly organized structures of the nose, i.e., the bloodvessels and nerves. The nasopalatine nerves, passing along the sides of the vomer, enter the septal ridge through the foramina of Scarpa. Here they are so protected by bony canals that the anaesthetic can scarcely reach them even if injected with a hypodermic, and consequently the patient suffers more or less pain in the upper incisors while the ridge is being removed.

More important however, is the injury to the bloodvessels. The two nasopalatine arteries, following the same course as the nerves, when they reach the septal ridge pass down through the foramina of Stenson, which joining like the arms of a Y, together with the foramina of Scarpa, form the anterior palatine canal, through

which pass up from the roof of the mouth the posterior or descending palatine arteries to anastomose with the naso-palatine. In removing the ridge therefore, we get hemorrhage from two distinct sources. This as a rule is easily controlled. If, however, secondary hemorrhage occurs, the wound must be opened and the clots removed. If the hemorrhage continues and is from the vessels where they are injured in the bony canals, it must be stopped by direct pressure as it is not affected by packing the nasal cavities. Union in these cases must take place by granulation.

A secondary hemorrhage might be retained between the flaps and be mistaken for the tumefaction following the operation. If there is any quantity of this blood it would not be absorbed but would be organized into new connective tissue, the contraction of which might later cause deformity. Then too the presence of blood between the flaps strongly predisposes to infection, which will result in perichondritis and subsequent deformity. The above considerations and the excellent condition of my cases where the ridge was not removed, have induced me to let it remain unless the indications are distinctly otherwise.

As to the age at which this operation should be done as an elective measure. In the aged it is usually uncalled for, and at the other extreme, fifteen years is a conservative limit.

While I am convinced that the septum as a vertical support takes no part in the preservation of the contour of the nose, I am equally certain that it does take a most important part as one of the forces in the development of the symmetrical adult organ, and therefore should not be removed during the years of most active growth.

The post-operative treatment of these cases is a matter of considerable importance. When I first began to do the operation, I used Bernay's splints of compressed cotton, covered with rubber tissue. I abandoned these for the following reasons: they are uncomfortable to the patient, they are difficult to sterilize; there is no certainty as to how much they will expand and interfere with the blood supply of the mucous membrane and drainage from the wound. On their removal I frequently found the mucous membrane excoriated and always the reaction was great.

A post-operative submucous case presents an excellent opportunity for us to use to advantage our knowledge of the changes that occur in the bloodvessels of living tissue that has been subjected to traumatism. We know that immediately following an initial contraction of the vessels, there is dilatation, and an increased flow of

blood. This is followed by a slowing of the current, stasis, exudation of serum and corpuscles from the vessels into the perivascular tissue, and necrosis and sloughing of that portion deprived of its blood supply. The indications here are clearly to prevent these later changes. In operating upon a mucous surface we have a distinct advantage, for by applying at once an emollient and protective dressing such as vaseline, we assist the blood-vessels in maintaining their normal equilibrium and thus limit the reaction, and favor the early return of the function of the mucous membrane. I have found vaseline gauze, prepared as I have described, well adapted for meeting these conditions, and when used immediately after the operation as I have suggested, the results have been much more satisfactory than I have obtained from any other method.

There has been much discussion as to whether or not the cartilage is reproduced. A brief consideration of the development of the septum will throw some light on this important subject. At about the eighth week of foetal life the septum is developed in membrane, from a process that extends downwards and backwards from the fronto-nasal plate, to divide the common nasal chamber into its two cavities. This process contains within itself chondrogenetic and osteogenetic foci, from which begin the development of cartilage and bone. This growth is aided by the perichondrium through its osteogenetic layer which also distributes nutrition to the cartilage in course of formation. Now when we remove the entire septum we take with it those primary embryonic elements necessary to the formation of cartilage and it cannot be reproduced by the perichondrium alone. If cartilage and bone should be formed in this location, it would furnish a precedent unique in pathology, for such reproduction to my knowledge has not occurred in other parts of the body. I offer this as an argument that the septum should not be removed, except from necessity, during the years when it is an active formative factor in the development of the nose.

In conclusion I wish to say that my experiences with the submucous operation have been entirely satisfactory, and my recent inspection of these cases leads me to believe that the excellent results obtained by this method are permanent.

69 West 50th St.

THE INDICATIONS FOR OPERATIVE INTERFERENCE IN MASTOIDITIS ASSOCIATED WITH ACUTE SUPPURATIVE OTITIS MEDIA.*

BY T. MELVILLE HARDIE, M.D., CHICAGO.

It is difficult to believe that practically all of the life-saving work in ear diseases has been limited to the past thirty-five years. (Schwartz's work was published in 1873.) Before that time, mastoid operations were not performed unless a perforation of the cortex of the bone had taken place with consequent swelling, redness and fluctuation over the mastoid process, and even at the present time it is possible to meet practitioners of medicine who have never observed a case of mastoid inflammation which demanded operation, although they have had patients succumb to one or other of the well-known intracranial or general complications or sequelae of the disease.

It should be possible for everyone to decide in a large proportion of

It should be possible for everyone to decide, in a large portion of cases, whether operation is necessary. In the remaining number, he can obtain assistance in every city which possesses an oculist and aurist who can use a head mirror and ear speculum as well as he can his ophthalmoscope.

The formation of rules for the guidance of the inexperienced is always a difficult undertaking. In this case, the difficulty is increased from the fact that the structure of the parts involved and the virulence of the infection are so variable that the symptoms subjective and objective vary likewise even when the pathologic conditions within the bone are similar. My single suggestion is that if we err at all it should be on the side of safety. One should operate too early rather than too late. We may now proceed to an enumeration and description of the symptoms which demand operation.

1. *Pain*: Consider its duration, situation and severity. Pain in the mastoid region is a very common symptom. It is frequently described by the patient as deep, boring, nauseating, usually worse at night. It is often just severe enough to cause sleeplessness. It may have come on with the acute inflammation in the ear, or it may not develop until some days after the ear has begun to discharge, or it may begin only when the previously profuse discharge from the ear has suddenly stopped.

* Read before the Chicago Laryngological and Otological Society, March 7, 1906.

Pain on pressure is a very important symptom of mastoid disease, but care must be taken both as to the method of eliciting tenderness and the situations chosen for its early demonstration. It must be remembered that very gentle pressure over an acutely inflamed periosteum might cause excruciating pain, while deep pressure would be required to elicit pain when the inflammation was deeply seated in a bone the structure of which was dense and compact.

Pressure, therefore, with the end of the thumb or forefinger is to be slowly and steadily increased over the antrum, the mastoid tip and the region of the mastoid foramen. When endeavoring to elicit antrum tenderness the pressure is to be made just behind the auricular attachment and upwards and backwards from the external canal. Care must be taken if there is any question as to the co-existence of mastoid disease and furuncle of the external meatus that neither the ear nor the cartilaginous meatus is moved. When examining the tip be sure to compare the two sides, as the normal tip is often sensitive to pressure.

Tenderness on pressure over the emissary vein which comes out through the mastoid foramen is also important, even although its presence does not indicate thrombosis of the sinus.

Finally, it is to be remembered that exceptional cases of mastoid disease exist in the absence of pain on pressure, and that not merely furuncle but occasional otalgias of hysterical or other origin may attempt to confuse us. Of equal importance, therefore, from a diagnostic standpoint, is the information we obtain by an examination of the external canal and drumhead.

2. The drumhead is markedly bulged forward or outward frequently even after perforation has taken place. The perforation is most often situated on the apex of this projection in the posterior superior quadrant of the drumhead.

3. Of even greater importance and, when it is present, a positive indication for performing the operation, is bulging or sagging of the skin of the posterior superior wall of the meatus near the drumhead. In this case again external otitis (furuncle) is to be excluded.

Symptoms 2 and 3 require upon the part of the examiner ability to use the head mirror and ear speculum. Seeing in this case is not merely believing but knowing, and the writer has always believed that the greatest service one can render his students in otology is to teach them the use of the mirror so that their inspection of the drumhead might be adequate. It is worthy of mention that this symptom may be absent or not marked in cases in which, while there is free drainage from the middle ear and antrum, an abscess exists at the mastoid tip.

4. *Discharge:* Very frequently the discharge of pus is profuse and if this has lasted for a week or more the necessity for operation is probable. In many cases the discharge suddenly diminishes greatly, or stops altogether, while the process in the mastoid progresses. A bacteriological examination of the pus is advisable; since, when the infection is due to streptococcus or pneumococcus, operation should be performed earlier, and the infection is likely to be more severe. This is particularly true of cases occurring in children.

5. The old-time symptom of edematous swelling, or swelling and reddening of the skin of the mastoid very often indicates neglect. When this is marked the auricle stands away from the head and if this occurs after the disease has existed for some weeks extensive absorption of bone in the process, and frequently perforation of the cortex has taken place. If the swelling occurs early the abscess is superficial, or the edema and other inflammatory symptoms are due to the periostitis associated with furuncle of the canal.

6. Another local symptom is a marked increase in temperature of the affected as compared with the sound mastoid.

7. Percussion of the mastoid performed with index finger or small hammer, is to be regarded of diagnostic value if it occurs in connection with other symptoms, especially if the dullness develops while the patient is under observation; but its value as a diagnostic aid is very limited because there is sometimes no difference in the percussion sound of the healthy and the diseased mastoid, and the sound may differ in the two normal mastoids of the same individual. Further, it cannot be used when there is swelling over the process¹.

8. Andrews' test to determine the density of the mastoid, and hence the presence or absence of disease, is open to the same objections since it depends upon the same physical laws. Andrews' test² is made by placing a stethoscope with a small bell over the tip and placing the handle of a C₂ tuning fork over the antrum. It is found that when the mastoid cells are filled with pus or granulations, or when the density is increased from bone proliferation, the sound waves are transmitted to the ears of the examiner with greater intensity and for a longer time than occurs when the mastoid is normal. No traction should be made upon the soft tissues since this will increase the sound.

9. I have said nothing as yet of the systemic manifestations of the disease because they are not, as a rule, characteristic. Usually temperature, pulse and respiration are not materially affected ex-

¹ Politzer. Diseases of the Ear, p. 504.

² THE LARYNGOSCOPE, vol. X, p. 416.

cepting in children in whom the temperature may rise to 104° F., even in uncomplicated cases. While there is usually a slight elevation of temperature in adults, and frequently one going to 101° or 102° F., fever may be entirely lacking.³

Decided prostration, indisposition to exertion, when present, are suggestive. Chills, vertigo, nausea, vomiting, sweating are unusual excepting in the presence of intracranial complications. These occur more frequently in chronic cases but must always be looked for, since operation must be performed promptly in the event of their onset.

Every case of acute mastoiditis complicating acute suppurative otitis media should, of course, have the benefit of preliminary antiphlogistic, or so-called abortive treatment before operation upon the mastoid is undertaken. This will include the free incision of the drumhead in the upper posterior quadrant and including the sagging inner portion of the posterior wall. Cold, either by means of the Leiter coil (of aluminum) or thin rubber ice bag should be applied for not longer than forty-eight hours. Too prolonged use of the ice is to be avoided since by its use the symptoms are masked. For the same reason analgesics should be administered only with caution and stinginess.

It has been claimed by Politzer and others of his school, that the surgeon should not operate, in the absence of symptoms pointing to intracranial involvement, before eight or ten days after the onset of mastoid symptoms, since it takes that time for the frequently disseminated foci of infection to coalesce or to become evident to the eye of the operator. This caution is to be observed particularly by surgeons who do not practice a complete exenteration of the process and cells extending into the zygoma. With this contention the writer is not in accord. The fact that many cases recover without operation does not balance the lives lost through delayed operation.

The three considerations, that all cases of acute suppurative otitis media exhibit pathologically antral and mastoid involvement, that cases of intracranial trouble are not infrequent, and that all of the chronic cases which give us so much trouble were originally acute, should determine the earlier and more frequent performance of this very safe and rather easily performed operation.

34 Washington St.

³ Grunert. *Arch. f. Ohrenh.*, Leipzig, Bd. XXXV.

ANESTHESIA IN TONSIL AND ADENOID OPERATIONS.*

BY L. C. CLINE, M.D., INDIANAPOLIS, IND.

It is with some timidity that I bring the subject of anesthesia for the removal of adenoids and tonsils before this section. As I believe that the last word has not been spoken, and inasmuch as our chairman has indicated to me that we are to lay aside formalities and have some heart to heart talks, and because I desire to know and to do the right thing is my apology for introducing this subject.

Some of the points I wish to suggest for discussion are:

1. Is it necessary to use a general anesthesia in all or the majority of operations for adenoids and tonsils?
2. If so, what is to be the choice of an anesthetic?
3. Cannot these operations be done just as efficiently with less shock and danger to life and post operative complications without a general anesthetic?

It is generally conceded that there is greater danger from anesthesia for operations in the upper respiratory tracts than in other parts of the body; which is doubtless due to the hypersensitiveness and the inhibitory power of the nerve supply to these regions.

The most important point to consider in the choice of an anesthetic is its safety. Anesthesia is a long step toward death. Dr. Holmes once said, "When we take an anesthetic we purchase a round-trip ticket, but not all use the return half." All discussion of this subject must necessarily hinge on the choice and manner of administration.

The details of operation are insignificant compared with the life of the patient. The advocacy of one anesthetic over another because it is easily and quietly given would not suffice for an explanation in case the patient did not survive. The majority that have reached the age of reason, would rather undergo a few moments of suffocation at the start, than quietly go to sleep with an added chance of not awakening.

I am indebted to F. N. Shipp of our city for the following quotation and statistics from a recent valuable paper upon this subject. "F. W. Huitt's statistics covering over a million administrations, show that death resulted once in every 3162 inhalations of chloroform, while with ether, one in every 16,302 proved fatal. He con-

* Read at the Meeting of the Middle Section of the American Laryngological, Rhinological and Otolological Society at Chicago, February 24, 1906.

cludes that chloroform is over five times as dangerous as ether.

"Let those who use chloroform as the anesthetic of choice put this clearly to the patients, tell them that chloroform is easy to take but that the danger from it is five times as great as from the inhalation of ether.

"If all patients were told this and given their choice of anesthetics, chloroform would be seldom used except in those few cases where ether is contraindicated."

Of the various substances that have been used for anesthesia, the great majority of the profession has practically settled down to the employment of ether and chloroform.

Experience seems to indicate that there are no other agents which act so well as these two liquids. Ethyl chloride is being used to a considerable extent. Potter gives a death rate for its use of one in 1500. Ware collected 11,207 cases of its use with one death. Wilcox claims ethyl chloride to be as safe as nitrous oxide gas. If we accept statistics we must give ether the preference.

Some argue that chloroform is safer with children, and practice giving it to children under the age of ten. According to recent observations this view is erroneous.

Three methods of administering ether are in use, namely: Allis type, the nitrous oxide ether method, and the more recent open drop method; all of which have their advantages.

The combination of nitrous oxide and ether has the advantage of using less ether, thereby lessening the post-operative complications. This method has the disadvantage of an expensive complicated apparatus which makes it more adapted to hospital use.

A comparison of a large number of cases in which ether was given with inhalers of the Allis Esmark type, with a similar number of cases by the open drop method show that the latter method has much in its favor compared with the former.

The amount of ether used is much less than with the inhaler and the proper mixture of air is assured, which greatly lessens the danger of after complications. The death rate from general anesthesia in these operations should receive more serious consideration. A few years ago, fourteen deaths were reported in England inside of three years. Not long since, eighteen deaths were published from the same cause, by a New York physician whose name I cannot now recall. When this subject is squarely and fairly put to parents they will nearly all, in my experience, tell you that they would prefer that their child would suffer a few moments' pain rather than be put to sleep and take the added chance that they will not awaken.

In the light of these experiences, I have practiced in a large measure, doing these operations without a general anesthetic, using local and in some cases no anesthetic. With a full appreciation of the criticism that the above statement is likely to bring forth and the belief by some that a thorough operation cannot be done except under general anesthesia I am ready to be put right if convinced my method is wrong.

I believe that in the majority of cases it is possible to do as clean and as thorough an operation with a local as well as with a general anesthetic. In regard to complete removal, it has been observed and demonstrated that recurrence and new growths occur occasionally after all methods of operation.

My custom is to have two assistants: one takes the child on the lap or on the right knee leaning forward against the patient's shoulder grasping the body, arms of patient at sides; feet off the floor if possible. The second assistant grasps the top of the head over the right shoulder of the first assistant. Both hold the patient firmly. A tongue depressor is passed over the tongue touching the pharyngeal wall, when the mouth will at once come wide open, the forceps or curette is then placed in position behind the palate, the tongue depressor is now withdrawn partially or completely so that the child has no obstruction to breathing. The majority of children in this position, if firmly held will struggle but little. The curette is passed high up in the vault and moved about until the mass of the tonsil or adenoid is felt to be grasped. A firm sweep with a little rocking motion will remove the mass. A second and third sweep on the sides will complete the work. If the forceps are used I usually finish with the curette.

These operations should not be discussed in the presence of the patient. I find that with a little preliminary kind treatment the operation can almost be completed before the child realizes what has happened, and they are certainly, with me at least, in better shape than after a general anesthetic.

Practically, the same preparation is carried out in removing tonsils.

There are other points in connection with this subject that might be of interest to all of us which I hope will be brought out in the discussion.

224 N. Meridian Street,
Willoughby Bldg.

SARCOMA OF BOTH FAUCIAL TONSILS.

BY C. D. CONKEY, M. D., SUPERIOR, WIS.

The following case of Sarcoma of the Tonsils is of special interest on account of the involvement of both tonsils by the malignant disease, which is a very unusual condition. Sarcoma of the tonsil is itself a rare disease. Bosworth in his treatise on the nose and throat published in 1892, compiles forty cases that had been reported up to that date. In only one of these, Schroetter's third case, did the disease appear in both tonsils. Since that date a number of reports of Sarcoma of the tonsil have appeared in medical literature, but I believe every case so reported was confined to the single tonsil.

Mrs. K., Irish, aged fifty-two, was first seen by me January 11th, 1905. The history then given led me to believe that she was suffering from gummatous involvement of both tonsils. For several months her throat had been inflamed, the right side being much worse than the left. It had not caused her much trouble till a few days before consulting me. For several days she had been having much pain. The patient was convinced that she was suffering from syphilitic disease, as she was laboring under the belief that her husband was afflicted with syphilis from whom she had contracted the disease.

I could find no evidence of syphilis outside of her throat. Her tonsils presented a peculiar appearance. They were large, pearly white, glistening and lobulated, with an occasional blood vessel running over the surface of the gland. Upon the right tonsil there was an ulceration the size of a dime, which was clean and bore little resemblance to the specific ulcer.

In view of the possible syphilitic history I decided that the case might be syphilitic, though struck from the first at the peculiar appearance of the tonsils. The patient was put upon large and increasing doses of iodides, also upon a sixteenth grain of Mercury Bichloride three times a day. This treatment was continued for two months, though she bore the iodides badly all the time from the first. The throat continually became worse and ulceration refused to heal. After treating the ulceration for two weeks with forty-grain solution of Nitrate of Silver and powdered Iodoform,

I decided to apply the galvano cautery. The cautery point penetrated through the outer surface of the growth and entered a softened broken-down mass beneath. This I curetted out, leaving a large cavity. The curetted substance was extremely offensive to the smell. After this both tonsils increased in size with great rapidity. At the same time the cervical chain of glands on both sides became enlarged. I then removed the growths with the galvano cautery snare, afterwards destroying all suspicious looking tissue with the cautery point. I also discovered a large mass at the base of the tongue of a similar appearance, which I also destroyed with the cautery.

The diseased tissue taken from the right tonsil was sent to the Columbus Laboratories for examination, and their pathologist, Dr. Evans, pronounced the tissue sarcomatous.

In view of the widespread extent of the disease I have considered the case inoperable, and up to the present I have confined my treatment to the local destruction of the diseased tissue, and to repeated exposure of the growth to the X-ray. The X-ray treatments are carried on by Dr. Saunders, a skillful X-ray specialist of this city. He has made sixty exposures of twenty minutes each. At each exposure the rays were directed for ten minutes upon the diseased tonsils through the open mouth and for ten minutes through the external surface of the neck. The persistent use of the X-ray has accomplished nothing unless it be a slight retarding of the growths. I have removed the entire mass on each side and thoroughly cauterized the base three times, and now after the third operation three weeks ago, the diseased tissue is rapidly returning and the cervical glands upon both sides of the neck are as large as hen's eggs.

Below I append the pathologist's report:

CHICAGO, April. 13, 1905.

Dr. C. D. Conkey, Superior, Wis.

DEAR DOCTOR: Referring to your specimen of tissue submitted to us on April 8th, we wish to report as follows:

This seems to me to be sarcoma. This opinion is based upon the following points: 1. There are no epithelial cells except in the mucous covering—carcinoma can be eliminated. 2. There is no focal arrangement and no giant cells—the granulation tissue is fairly vascular—tuberculosis can be excluded. 3. There is no

perivascular lymph channel arrangement, no focal arrangement and no reaction to specific treatment. Syphilis is improbable. 4. The tissue contains few leucocytes, few wandering cells. It is composed of fibroblasts, angioblasts, a moderate number of young fibres and a few wandering cells—lymph elements are scarce. There is no miliary abscess arrangement. Staining for bacteria is negative. The difficult diagnosis is between an unusual tonsil infection and sarcoma. We think it is the latter for the exclusive reasons mentioned and because of the preponderance of young cells and vessels.

Thanking you for this specimen, we remain,

Very truly yours,

COLUMBUS MEDICAL LABORATORY.

Suppuration of the Ethmoidal and Sphenoidal Cells. R. C. DUGAN. *St. Paul Med. Journ.*, October, 1904.

Suppuration in the orbit in connection with infection of the ethmoidal and sphenoidal cells is no uncommon occurrence, but frequently exhibits no previous symptoms of trouble in the nose. In one case, a child three years old, was taken suddenly ill in the night with convulsions, only one side of the body being involved in the convulsions. These continued for twelve hours. Mastoid disease with brain involvement was suspected but nothing could be determined by examination of the ears. After forty-eight hours the left eye suddenly bulged forward, and an incision in the upper inner part of the orbit disclosed pus. The infection had its origin from the anterior ethmoid cells. In another case the first symptoms were those of eye-ache followed by bulging. In this case there were no previous nasal symptoms.

An incision over the eye gives better drainage, shows less of a scar and lessens the danger of a dacrocystitis complication.

STEIN.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, April 25, 1906.

T. PASSMORE BERENS, M.D., Chairman.

PRESENTATION OF PATIENTS.

Cleft Palate: Operation. By LINN EMERSON, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DR. EMERSON said that the patient, a boy of 8 years, first came under his observation about a year ago with a complete cleft of the hard and soft palate, but no involvement of the lip. In addition to this, he had a very large adenoid. This was removed at the time of the first operation about a year ago; and at that time, a partial closure of the cleft was obtained. Another operation was done last November, and the third and last operation was done February 23, 1906. The procedure followed was that laid down by Owen in his monograph, which is only a slight modification of that described by Brophy. In this connection Dr. Emerson presented the Sims hollow needle, which he had found to be a great assistance. The one which he showed had been obtained from Weiss of London, as those which he had found here were not satisfactory. There are four or five needles in a set, having different curves. The Doctor also showed two elevators which he used for the operation; but beyond these, he had used only such instruments as he had in his usual stock. At the first operation, in his attempt to make more rapid progress, he tore one of the sides slightly and had to put in a longitudinal stitch. After the first operation there was a small bridge of tissue in the middle. At the second operation the cleft in the hard palate was completely closed, and the third operation completed the closure of the soft palate. This was the first operation of the kind that the Doctor had attempted and he felt much gratified at the result. The boy can now blow a whistle without holding his nose, and, as the Section could see by his manner of counting, he had a very good enunciation. This certainly seemed a very good result for a boy of this age who had had a palate for less than a year.

DISCUSSION.

DR. SMYTH said that he had been much interested in this case, as he himself had had two similar cases, and he wished to congratulate Dr Emerson on the excellent results obtained. He had followed very much the same routine, that described by Owen, in the case of a child of fifteen months, and obtained very satisfactory results, it healing perfectly except the uvula. He had not united the uvula, however, in the last case, for in a former experience in getting a sufficient stitch to hold firmly, part of the uvula was lost. The child is talking well and doing nicely. He would suggest that a better result can often be obtained by anchoring the wire sutures with lead plates as recommended by Brophy. The wire has a tendency to pull deeply into the soft tissues during the healing process, and is liable to cut out; whereas if a lead plate with perforations is used on either side, and the sutures passed through these and twisted together, this cutting through is prevented.

DR. EMIL MAYER said that, in regard to the uvula, a recent writer had made a suggestion which appealed to him, that is, to slit the uvula sidewise, leaving a very much broader uvula, and giving a better chance for the final healing, and avoiding the effect of which Dr. Smyth had spoken.

DR. EMERSON (closing) said that another reason to which he attributed the pulling out of the stitches was that after the first operation he had permitted the boy to have fluids; whereas after the last operation he was permitted to have nothing by the mouth for four days, all the feeding being done per rectum. He thought that this was where most of the trouble had arisen. There were stitches in the soft palate both times, and he attributed the pulling out of the stitches the first time to the fact that he was allowed fluid, whereas the last time when there was no trouble with the stitches, he was not allowed anything, even water, by mouth.

Frontal Sinusitis, Operated upon by Dr. Coakley. Presented by
W. A. CHISHOLM, M.D.

The patient had come to Dr. Coakley last October, suffering from chronic suppuration in the right frontal sinus and right antrum. On the 16th of October, a complete Killian operation was performed on the right frontal sinus. This being found to be more than usually extended, the antrum was left for subsequent treatment. Nine days after the operation, Dr. Coakley presented the case before the Section for inspection. At that time, there appeared to be com-

plete union in the line of the incision, and owing to the thickening of the soft tissues and slight edema there was very little deformity. Five days later, however, there was a slight sloughing in the lower part of the wound where the slight concavity now showed, and this opened into a large cavity which was the result of the removal of the ethmoid cells. This closed up later, but there is still quite a little depression at that point. The antrum was treated by a large opening in the inferior meatus. This opening was still patent. The antrum was washed out through this opening, but the last few washings have remained completely clear, showing no secretion in the antrum. The frontal sinus seems to be all right with the exception that every few days he blows out a little scabby secretion from the nostril on that side, which evidently comes from the fronto-nasal duct. The patient no longer suffers from the headaches of which he previously complained. The main object in presenting this patient tonight was that the Section might have an opportunity of observing the deformity resulting from the Killian operation upon the sinus. The depression is more marked than in the operation which Dr. Coakley usually practices. He proposes to remedy this by a paraffin injection next week, and will again show the man in order that the results of this procedure may be noted.

Papillomatous Growth in the Larynx. By S. McCULLAGH, M.D.

The patient, a man of 30 years of age, a driver, appeared at Dr. Coffin's clinic about three weeks or a month ago. Family history negative. Had measles and mumps in childhood. Four months ago, he first noticed a hoarseness which has been growing progressively worse and is now quite marked. There is no pain or tenderness over the larynx. Has gained 12 or 15 pounds since the trouble began. He denies any specific history. Examination reveals a grayish papillomatous mass in the anterior commissure springing from both cords and involving about a third of the length of the cord. The septum is thickened and somewhat deflected to the left. There is chronic follicular pharyngitis and naso-pharyngitis, and hypertrophied tonsils. Examination of the chest shows a slight relative dulness over the right apex anteriorly; no rales. Expansion good. The examination for tubercle bacilli was made three times, twice by his own doctor and once in the hospital, and proved negative. Dr. Jonathan Wright saw the case yesterday and seemed to think that it was a papilloma of the larynx with an acute process grafted upon it due to the hypertrophied tonsils and the condition of the pharynx and naso-pharynx.

DISCUSSION.

DR. MAYER said that in the case of the man with a papillomatous growth in the larynx his age, 30 years, would seem to lessen the possible danger of its being malignant, and that its character would be determined as soon as it was removed. He would like very much to hear the report of the microscopist concerning it.

Pansinusitis, Left: Operation. By S. McCULLAGH, M.D.

The patient, a woman, about 40 years of age, presented herself at Dr. Coffin's clinic at the Manhattan Eye and Ear Hospital, the latter part of November, 1905, complaining of headache, pain over the left frontal sinus and ethmoid region and some pain over the maxillary antrum. There was tenderness on percussion and pressure over these regions. Transillumination showed both dark. The left middle turbinate was enlarged and there was pus in the middle meatus, both anteriorly and posteriorly. The anterior end of the middle turbinate was removed and the maxillary antrum washed out by puncture through the inferior meatus, which washing showed an empyema.

The pain continuing and subsequent washings showing pus, a radical operation was decided upon and on January 26, 1906, with the assistance of Dr. L. A. Coffin, the frontal sinus was opened by Killian's method. The mucous membrane of this sinus was polypoid and pus was present. The ethmoid cells and sphenoid sinus contained pus and granulation tissue. These were thoroughly cleaned out. While cleaning out the ethmoid cells posterior to the orbit, that cavity was broken into and quite a severe hemorrhage took place into it, as marked exophthalmos promptly occurred. This gradually subsided in the course of two weeks with no untoward effect. The maxillary antrum was then opened through the canine fossa. The mucous membrane lining it was polypoid and there was pus contained in it. This was thoroughly cleaned out. The mucous membrane of the inferior turbinate was preserved and used to cover the floor of the cavity. The nose was then packed, the frontal wound being closed by sutures and collodion, except for the lower angle into which a small rubber tissue drain was inserted. The wound in the mouth was permitted to heal by granulation; the packing was all removed at the end of 48 hours and was not re-inserted.

Immediately after the operation, the temperature rose to 102° but soon returned to normal and recovery was uninterrupted. When she left the hospital, about two weeks after the operation,

there was some crusting in the nose, but this has entirely disappeared and as may be seen, the nose is perfectly clean.

Report of Cases of Submucous Resections. By W. W. CARTER.
M.D. (*Published in full in this issue of THE LARYNGOSCOPE,*
page 461.)

DISCUSSION.

DR. MYLES expressed appreciation of the very valuable paper which Dr. Carter had presented. A very important point was made in regard to the nasal process of the superior maxillary bone, and the ridge on the anterior lower part of the vomer. In his own experience, he had removed many and had left many. Fifteen or twenty years ago there was considerable discussion concerning the profound neurasthenic conditions which followed the trephine operation on those parts, and it was attributed to injury done the nasopalatine artery and spheno-palatinal nerve, from which it sometimes required months to recover. In some cases he had removed a part of the perpendicular plate of the ethmoid in order to gain entrance to the regions above. He laid much stress on the importance of counter openings in this class of cases. He did not now use Freer's incision but used the circular one which he had described in 1896 before the American Medical Association in Atlanta, in reporting a series of vestibular stenoses. Since then he had tried the methods advocated by Freer and others, but had finally returned to his earlier method and obtained very excellent results where counter openings were made into the upper part of the cavities. He never removes all the anterior end of the cartilage now. Union by first intention usually occurs at the lower part. When a hematoma forms and becomes septic it is a very serious proposition, and one has to act quickly and make large incisions which should be kept open, otherwise the perichondrium of the remaining cartilage is liable to be affected and a deformity result. All of his cases terminated favorably without a single perforation, but in some cases there had been interruptions in the usual favorable progress.

DR. SIMPSON said that when an operation was being so much used as this one, it was important that all the points concerning it should be thoroughly discussed, and Dr. Carter had presented a number of important points. So far, only the successful operations have been reported, and doubtless those who made these reports were all honest, but if all our cases are carefully looked over we should probably find that in some of them everything has not gone just as we should like. Dr. Carter had referred to a most im-

portant point when he emphasized the necessity of removing only what is absolutely necessary. As some one has said "it is better not to attempt too much cabinet work in the nose." The object of the submucous resection is to get a sufficient amount of intranasal drainage and breathing, and to retain the shape of the nose. If too much of the septal ridge were removed, in addition to the neurasthenia which has been mentioned and the danger of hemorrhage, there was a tendency to drag down the superior arch of the nose, and if the superior cut were made very high up, this additional danger of having a saddle nose was increased. Another point is, that perhaps all of those fine points of detail which have been so emphasized by some are not really necessary. We should learn, if possible, to operate with only such instruments as seem best adapted to do the work thoroughly, and not to require a separate instrument for each detail of the work. Nothing has so bad an influence on one's good work as to see another come up with a great variety of instruments which he finds necessary for the same kind of work. The psychological effect is sometimes very bad, and in the attempt at super-refinement of technique a man sometimes finds himself not so well off as with a simpler method. We should retain only those instruments which do the work best for us. Another important point which had been mentioned was the vaseline dressing. In his own experience, one of the most trying features of the operation was the removal of the dressing afterwards, and the vaseline dressing which Dr. Carter had described appealed to him very strongly. It is sometimes, however, necessary to look out for a secondary hemorrhage from the beginning, and a fair amount of packing is necessary. He had had several cases where he wished to use as little dressing as possible, and some of these had been followed by secondary hemorrhages. If it should be found possible to combine the packing with Dr. Carter's method of dressing it would be a great advantage. There was also some danger of making too large an opening, and care should be exercised in this respect.

DR. YANKAUER said that the members of the Section were much indebted to Dr Carter for presenting the results of his observation on cases which had been operated upon some time ago. This was the first report that had been presented giving the subsequent results of submucous resection, and he himself was glad to note that Dr. Carter's experiences corresponded entirely with such observations as he had made in his own practice. It was remarkable to notice the subsequent changes which take place in the nasal mucosa on both sides after the straightening of a deviated septum by

this method. Hypertrophies disappear, and points of depression round themselves out, and the entire interior of the nose assumes a normal aspect. He had been especially interested in the case which Dr. Carter had mentioned as having received a severe blow on the nose without deformity. He had rather feared that when many cases of submucous resection had been performed we should begin to notice a large number of traumatic saddle noses. Probably one reason that this does not happen is that a deviated septum is in itself a weak septum, and, in removing it, that particular nose is not weakened to any extent. It was, however, gratifying to receive the assurance that a nose which has been resected has received a considerable blow without injury. He had been surprised to note for how long a time Dr. Carter leaves the pledget of cotton in the nose to obtain the anaesthesia—20 minutes. Dr. Yankauer himself obtained thorough anaesthesia in five minutes. The question of the removal of the nasal crest was important. In some places this might be left in place. If such a septum were seen and the judgment were that there was a slight spur, but hardly severe enough to require removal, such a result might be considered very satisfactory. Even if such a slight ridge remained, the result could be considered satisfactory. On the other hand, there are a considerable number of cases where the bony ridge is so markedly deviated, that no good will follow the removal of the cartilage alone. He had that day seen a case where a submucous resection had been done and only the cartilage removed, but the result was very unsatisfactory. There was a mucous membrane septum, but its position was exactly the same as before the operation. In this case it was very evident that the bone should have been removed, as far as the median line. He had not experienced any difficulty with hemorrhage from the removal of the bony crest, though he had done this a great many times in severe cases. He did not remember having any cases of secondary hemorrhage, and but one or two cases of hematoma. These have occurred in patients who themselves removed the packing before the end of 48 hours, contrary to orders, but they healed subsequently. It was not always necessary to remove the crest so far anteriorly as to interfere with the large blood vessels or the nerves. It was not necessary to remove the vomer down to the groove in which the nerve runs. This groove is considerably below the edge of the vomer, probably a quarter of an inch, and in breaking off the vomer it can be removed without injuring the nerve. The results of the operation as reported by Dr. Carter were certainly very encouraging.

DR. ABRAHAM said that he also wished to thank Dr. Carter for the concise and thorough manner in which he had presented the subject. The first submucous resection which he himself had performed was in 1898. This was a flap operation. Since then he had operated on something over a hundred cases, and he had never had any hematoma and only two perforations, which occurred in the first 10 cases operated upon. He had tried various means of packing, and had finally come to rely upon the method which he had reported to the Section two years ago, i.e., splints made of strips of gauze wrapped around with sterile gutta percha tissue, each made for the individual case. The ends are closed by heat and then at each angle a little piece is removed, and the edges of the rubber tissue nipped slightly, in order to facilitate free drainage. This splint is placed in the nasal cavity and allowed to remain for about two days, sometimes longer. He had never had any temperature in cases treated this way, and no interference with the drainage, and had never had a hematoma in a single case. He attributed this entirely to the free drainage and thorough packing. In regard to removing the cartilage, he told of a case upon which he had operated two years before, removing the redundant cartilage on the convex side of the septum. The patient did not return until two months ago, when he attempted to correct the remaining deflected portion, by the Killian operation. After elevating the mucosa he found that a complete fibrous union had taken place in the lower segment of the septum where the cartilage had been removed, and there was no attempt at a reformation of cartilage. He did not believe that there was ever a reformation of cartilage when once removed. This was the second case that he had operated upon a second time. In regard to the crest, he always tried to preserve it. It is not always necessary to get a plane surface as long as we restore normal respiration free from obstruction. If we can restore normal breathing without interference to the secretions and at the same time retain the major portion of the bony and cartilaginous framework of the septum by a single flap operation, allowing the patient to retain a strong supporting septum instead of a soft fibrous one, we should then discharge the patient and be contented.

DISCUSSION.

DISCUSSION—DR. CARTER'S CLOSING REMARKS.

DR. CARTER, in closing the discussion, said that he wished to be understood as favoring the removal of the incisor crest and septal ridge when it is distinctly an impediment to respiration and drain-

age and when he is satisfied that the spur is composed largely of bone, and hence will not undergo atrophy. He had to remove the crest for this reason in 20% of his cases, and he believes that this is about the proportion in which it will be found necessary to do so.

Dr. Yankauer had spoken of not injuring the arteries. In reply Dr. Carter stated that when the ridge and crest are removed, it is impossible to avoid injuring the vessels where they pass through the canals of Stenson, which are in this ridge.

He said that he was much interested in the case reported by Dr. Abraham, where he had done a secondary operation and found that the cartilage had not been reformed. This coincided with his own observations, though he had not operated a second time on any of his cases. He thought that the non-reproduction of cartilage had a very important significance in the operation.

Clinical Report of the Use of Alypin as a Local Anesthetic in Intra-Nasal Surgery. By W. C. PHILLIPS, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

Report of a Case of Papilloma of the Larynx in a Child. By F. N. McCREERY, M.D.

M. F., 2-1/2 years old, female, was brought to the office, August 11, 1905, suffering from marked laryngeal dyspnoea. Condition had developed gradually during the preceding six weeks. Tonsils and adenoids had been removed three weeks earlier, without relief. The larynx could not be inspected; there was no membrane visible. Culture from pharynx reported the following day to be negative.

The next day the child was brought back. The dyspnoea was much worse and the condition one that might at any moment become exceedingly dangerous. Intubation was done in the office but without relief, in fact condition was made worse. Tracheotomy was then done with instant and complete relief. The child was sent to a private hospital. The following week it was seen by Drs. Culbert and Brown, both of whom concurred in the diagnosis.

It was thought by all that laryngo-fissure would ultimately be necessary to remove the growth. Dr. McCreery left the city on the 15th. On his return, October 1st, the child's general condition was excellent, but respiration impossible except through tubes.

Careful search of the literature of such cases, convinced Dr. McCreery that further operation interference at present was not advisable. Thyrotomy gives only 36% of cures; eudo-laryngeal

treatment, about 45%. The latter course was impracticable because of the child's terror. Many cases are reported to have recovered spontaneously after tracheotomy. Accordingly the child has worn tube up to present time, without inconvenience and with excellent general health. Respiration is still impossible without the tube.

The child was brought to the meeting, but her fear of examination was so great that she could not be shown to the Section. She was, however, seen in the ante-room by the chairman, Dr. Burns, by Dr. Delavan and by other members present at the meeting.

DISCUSSION.

DR. WILSON advised Dr. McCreery to do nothing further than leave the tube in the trachea. In 1897 he had exhibited a case before this Section in which after performing laryngotomy on two occasions, spraying with alcohol, intubating and finally allowing a tracheotomy tube to remain in situ for 2-1/2 years, the child made a good recovery. I now feel that if I had only tracheotomized and not split the larynx and scraped it, the boy's voice would be better than it now is. Only a year ago he had had a similar case, made a tracheotomy, and left the tube in for a year. The child has made a perfect recovery and voice is clear. Where a laryngotomy is done the growths always recur. He had seen six or seven such cases where the growth recurred and was removed several times. He would like very much to hear from this case a year later.

DR. SIMPSON said that Dr. McCreery had emphasized one point about which there should be no exception—the question of intubation or tracheotomy. If you do not know the character of the obstruction, do not intubate. He had seen several very serious accidents resulting from intubation where the nature of obstruction was unknown. Do not intubate unless you are immediately prepared to do a tracheotomy, especially in these subcordal cases of papilloma.

DR. DELAVAN said that he had seen and examined the patient and had found her to be an extremely bright, good-looking, little girl of three years, surprisingly active and well-nourished. She seemed to be perfectly healthy. It was certainly a matter for congratulation that the Doctor had refrained from further operation. It was somewhat surprising that thyrotomy should be advocated in these cases when so much has been written in opposition to this form of interference. In the most reliable of recent articles, published in the last volume of the "Transactions of the American Laryngological Association," by Dr. J. Payson Clark, of Boston,

SOCIETY PROCEEDINGS.

it had been proved that the most successful method of treatment was exactly the proceeding which the reader of the paper had presented. The matter being not a new one and the ground having been gone over before by so many different writers, it seems strange that there should be any question regarding it. The performance of thyrotomy in a child two years of age is very serious, both in the actual doing of the operation and in the injury to the integrity of the larynx, even if the child should live. The mortality rate is very high. There was no doubt but that this case had been very skilfully treated, and the excellent condition of the child certainly warranted the course which had been followed. The growth is apt to recur up to a certain age, after which time the tendency to recurrence diminishes, and later on if recurrence should take place it may be possible to operate with some chance of success.

DR. McCREERY said that he would like very much to know the opinion of the gentlemen present in regard to the probability of the occurrence of cicatricial stenosis, as this was one of the reasons why laryngotomy had been urged by one of the physicians whom he had consulted.

DR. SIMPSON said that there would be less trouble if the tube were left in place, and if the growth ceases to recur the subsequent stricture could be removed by dilatation later.

DR. JOHN ROGERS said that everything depended upon where the tracheotomy wound was. Most of the tracheotomy tubes were made for any child and might or might not fit. A high tracheotomy with a long curved tube was very liable to make a "spur" behind, or a stricture if the fistula was made at one side. He did not think there was anything to be feared about a stricture if taken in time. If the wound is in the middle and not too high, and the curve of the canula is not too sharp, the chance of stricture is apt to be slight. Everything depends upon where the incision is made.

Dr. Rogers said that he had listened with a great deal of deference to those who had had experience with these papillomata, but felt that he must enter a slight remonstrance. He had seen two of these cases this winter, and hoped to present one before the Section later on. In this case, he had opened the larynx and trachea and cut through the hyoid bone, excising all the papillomata, and then put in an intubation tube and sewed the wound tight. That was nearly a year ago and there has been no recurrence of the growth. He thought it probable that the recurrence was due to deficiency of excision. It is difficult to get out all the papillomata. He had

used a packing saturated with adrenalin, before attempting to do the extirpation. He was confident that, in one of these cases at least, the attempt at extirpation has been successful. It was generally more satisfactory to the parent to have at least one attempt made to remove the growth, and if the child were his he would hate very much to see it go with a canula for two years, with the possibility of ultimate failure. Of course, there is some risk, but he doubted whether this was greater than with the ordinary tracheotomy.

PRESENTATION OF SPECIMENS.

Foreign Body Removed from Bronchus. By EMIL MAYER, M.D.

DR. EMIL MAYER presented a brass cap doubled upon itself that he had removed the day previous from the right bronchus of a boy aged 9 years. The patient was doing well then. (He has since been discharged entirely well, with no untoward symptoms.) The history was briefly given then and will be presented in full in a forthcoming paper before the Section on Laryngology of the American Medical Association, where the speaker will present his experiences in five cases seen by himself within a short time.

DISCUSSION.

DR. YANKAUER said that in searching for the foreign body with the bronchoscope through the natural passages the tube used was quite narrow and long, and the illumination at the bottom was very deficient. The foreign body was dark brown in color, like the congested mucous membrane of the bronchus. The tube being one quarter of an inch in diameter while the bronchus was wider, it is probable that the tube was able to pass down and slip over the foreign body which was not observed on account of being nearly the same color as the lining of the bronchus. He had been able to get the bronchoscope into the right bronchus so far as to see the three openings into which it divides, and could see clearly that there was no foreign body there. Later, when the tracheotomy was done, a much wider tube was used, fully a centimetre in diameter, which filled up the entire lumen of the right bronchus; the foreign body was brought into sight at once and its removal was easy. The case was very instructive in this respect, that a foreign body of this color may be unobserved and missed by the bronchoscope. Had the foreign body been white, like a button, and not encrusted with lime salts, or had the patient been an adult, he would not have hesi-

tated to go in through the natural passages under local anaesthesia. He had done this several times for diagnostic purposes, but to remove a foreign body was a different matter, especially after prolonged ulceration had covered it with secretions. It is then apt to be found lying in a small abscess, and there is difficulty in removing it. Killian himself has said that in removing a foreign body it is safer to do a tracheotomy and go in below, as the manipulation is easier. These patients have all a certain amount of pulmonary inflammation, and it is advisable to reduce the time of the anaesthesia to a minimum.

DR. MAYER said that we are learning a great deal about bronchoscopy. This was the third case that he had had in a year's time and the fifth case that he had seen, and every single point that could be brought out in regard to them was of distinct advantage. He would, however, recommend that in cases of foreign body in these passages a tracheotomy be done first to remove it. In all probability this would be less serious than the edema and consequent inflammation which would result in the attempt to remove it through the natural passages.

A New Muco Perichondrial Elevator.

DR. ABRAHAM presented an elevator which he found of great service in separating the tissues of the opposite side in doing the submucous resection.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, April 3, 1906.

OTTO T. FREER, M.D., *President.*

Transillumination of the Mastoid Cells as an Aid in Diagnosis.

By A. H. ANDREWS, M.D., Chicago.

DISCUSSION.

DR. NORVAL H. PIERCE: I believe that transillumination in this region, as well as auscultation, which Dr. Andrews has advocated, has been used to a considerable extent in the past. The same factors that cause transillumination to be a method of diagnosis that is subject to very great variations in its use in the frontal and maxillary sinuses hold good when we use it in transillumination of the mastoid region.

Dr. Andrews has quoted a case where the anatomical peculiarities rendered the method unsatisfactory. I can imagine, however, in those peculiar cases of acute exacerbations in chronic conditions, or in acute conditions, when there is extensive destruction within the mastoid accompanied by little temperature and little or no infiltration of the outside, that transillumination might be of great assistance in leading us to the proper course of treatment. These are the very cases where we need the greatest help, but it will not differentiate, for instance, a periostitis from disease of the interior of the bone, nor will it differentiate edema of the exterior of the mastoid following a furunculosis of the external auditory canal. It will not be of any service to us in any case where there is infiltration along the external auditory canal, either in chronic or in acute cases, in my opinion. I have had no special experience with this method, therefore I am speaking from off-hand judgment, but I am inclined to believe that it may have a place in rendering valuable assistance in those cases where we most need assistance. At the same time, we must always bear in mind that the difference in the formation of the parts on either side in a given case may always cast a greater doubt on the results of transillumination than is cast in the case of transillumination of the antrum of Highmore, and even of the frontal sinus. Among such differences we may mention the size and shape and position of the sigmoid sinuses, the difference in arrangement of the pneumatic cells, etc. Transillu-

mination of the frontal sinus is of less value than is transillumination of the maxillary antrum. I should say that mastoid transillumination stands third in importance or reliability, if we put transillumination of the maxillary sinus first, transillumination of the frontal sinus second.

DR. GEORGE E. SHAMBAUGH: I think we should all welcome this method which Dr. Andrews has demonstrated of assisting us in making a diagnosis of what is taking place inside the mastoid process in those cases where we have difficulty in determining what the condition may be. In ordinary cases where distinct symptoms appear over the surface of the mastoid, we need not call upon this method as we have much more definite and accurate means of determining the state of affairs inside the mastoid than this method can afford. This method which the doctor has presented is, however, especially intended for those cases where the outer shell of the mastoid is dense and hard and prevents symptoms appearing early over the outer surface. It is in just these cases where it is most urgent that we determine the condition in the mastoid cells, for the hard outer shell of the mastoid tends to force the pus to rupture internally with much more serious results than when the rupture is through the outer surface of the mastoid.

I should expect this method to give the most positive results in those cases where the need for calling upon extra assistance in diagnosis is the least, that is where the pneumatic spaces completely fill the process allowing pus to get near the surface of the bone. On the other hand this method would be least likely to give much assistance in just those cases where the need for assistance is the greatest, that is where either the external part of the process is diploetic and not filled with pneumatic cells, or where in cases of chronic suppurative otitis media the larger part of the process has undergone the process of osteosclerosis with obliteration of the pneumatic spaces. It seems probable that in such cases where the mastoid is diploetic or sclerosed the shadow cast would not be as marked as when the process was filled with pus.

An objection which I should think would interfere more or less with the efficacy of the test, would be the passage of light through the soft tissue between the speculum and the bony wall, in which case it might appear at the end of the speculum as though it had passed through the mastoid process. We meet with this difficulty in applying transillumination to the frontal sinus, and in order to obviate the difficulty it is necessary to use a lamp that can be placed well back under the ridge of the orbit. In the case of the mastoid,

we have no ridge to get under. Again I should expect that where we attempted to obviate this difficulty by placing the lamp far back on the process we would have cases where a deep shadow would form because of an external position of the lateral sinus.

This method however, is one which I should not be surprised to find that we will all be using some day to assist in doubtful cases, just as in the accessory sinuses of the nose the transillumination is in universal use as an aid in diagnosis. I should not expect this method to give us as reliable information as when applied to the maxillary sinus, and perhaps not as valuable as the transillumination of the frontal sinus. In using it for the mastoid we have an advantage over especially the frontal sinus in that the type of mastoid varies less on the two sides than does the frontal sinus.

DR. JOSEPH C. BECK: I have been very much interested in Dr. Andrews' paper with regard to transillumination of the mastoid. I have had experience with it in quite a number of cases, and am somewhat interested in it, but I have found it wanting in most cases. Where I found shadows and had made a positive diagnosis by that method, in opening the mastoid I found that it was quite free from any granulation tissue or necrosis, such as I had expected to find. If there is any method that is going to aid us in the diagnosis of these cases more than transillumination, it will be the use of the X-ray in diagnosing doubtful cases. I learned transillumination of the mastoid from the master or originator of the method, Dr. Urbantschitsch, at his clinic, and practically it is not used there at all, nor is it used in most of the foreign clinics, contrary to what the author of the paper believes as to the diagnostic value of the method.

I agree with Dr. Shambaugh, with reference to the adaptation of light to the mastoid process, that it does pass between the membranous canal and the bony wall, or the external wall of the mastoid process, and the light would show through the skin rather than through the bone.

I have had some experience with the use of the X-ray, and am working along that line. I believe it is a valuable aid to diagnosis. So far as the maxillary sinus is concerned, I believe the method of Dr. Andrews is excellent. I have recently been using transillumination of the frontal sinus on both sides at the same time, simply because the usual method of transilluminating the frontal sinus is very unsatisfactory, as Dr. Pierce has stated. I use a tube that illuminates both sinuses at the same time, but it does not help me very much in making a diagnosis.

The other points made by the author with reference to the diagnosis of mastoid disease are certainly of great value.

DR. ANDREWS (closing): As far as the method of examination being new is concerned, I have made no claim to priority, although I must confess that I know of no one who has preceded me in the use of this method. There is a difference between originality and priority. A man can do original work without being the first to have followed out that line of investigation.

With regard to furuncles in the auditory canal, of course, if the canal is so swollen that the speculum cannot be introduced, we would not expect to get much or any result; but if the canal is sufficiently open, and if the furuncle has caused edema of the canal, it does not perceptibly change the condition of light transmission. I have not thought that this method of examination is infallible. I cannot claim for a moment that when the light fails to pass through the mastoid and to be seen in the auditory canal, that that of itself is pathognomonic of mastoid disease, and I think, so far as that is concerned, that the same may be said of shadows in the neighborhood of the antrum of Highmore, and also of shadows in the neighborhood of the frontal sinus. While they point toward the existence of disease, they are not pathognomonic.

With regard to the light passing around and through the skin, I have not observed that light shows very much of a tendency to go around corners, especially when there is nothing to reflect the light. If those who have used the light and failed to get satisfactory results, will use it on the cadaver, and make control tests, they will so improve their technique that they will be able to get more or less satisfactory results from the use of it on the living mastoid.

Case of Double Frontal Sinus Disease. By LOUIS OSTROM, M.D.,
Rock Island, Ill.

The photograph shown herewith, shows some of the things we do outside of Chicago. We do not have the opportunity of exchanging ideas as you have here. We sometimes, however, see some very interesting cases. This patient, Mr. F. C., aged 24, was incapacitated from work for six years, on account of so-called frontal neuralgia. Six years ago he had La Grippe. Since that time he has had constant frontal headaches. For the first two years there was more or less discharge of pus, but in the last four years there has been no pus, but occasional thick lumps of mucus. The patient went the rounds of several physicians, until he visited Dr. Bernhardt of my city, who kindly referred him to me. His nose was examined and found to be normal. The middle turbinates

were not swollen, the mucous membrane was healthy looking, and probing frontal duct brought no pus. Tenderness over the frontal sinuses was so marked that I felt warranted in making a diagnosis of double frontal sinusitis. Transillumination in this, and all other frontal sinus cases, has not been satisfactory in my hands, because this and all other acute or chronic sinus cases showed distinct light reflex, while many cases having no frontal sinus disease have not transmitted light. I have used Freer's modification of Jackson's lamp. The man was in such a condition that he could not work, could not sleep, and could not eat, so that he was willing to submit to almost anything. I removed the anterior ends of the middle turbinates about three weeks or so before I operated on the frontal



Case of Double Frontal Sinus Disease.

sinus, which gave him partial relief. I started out with the intention of doing a double Killian, but his nose was too narrow, so I decided on Coakley's open method. My first incision extended from outer end of right eyebrow, in a curved direction one-half centimeter above the supraorbital ridge, to median naso-frontal suture, the periosteum was elevated, and the sinus entered with a gauge, removing considerable bone without puncturing the mucous membrane. When the mucous membrane was incised, about half a dram of clear watery fluid flowed out first, then masses of polypi and granulation tissue, and necrotic bone were met, completely filling the entire sinus. This was scooped out with a curette, and the septum which was one and one-fourth inches to right of median

line, and which was partly necrotic, was broken down, and a like condition was found in the left sinus. A similar incision was then made from the outer end of the left eye-brow, extending to one-fourth inch from median end of right incision, leaving a bridge of skin and periosteum over the glabella. The anterior walls of both sinuses were removed, leaving both supraorbital ridges; the mucous membrane of the sinuses was carefully removed with sharp curettes; the naso-frontal duct and anterior ethmoidal cells destroyed with curette, the cribriform region being carefully avoided. On completion, the actual size of the sinus, measured from the ledge of bone over glabella was: height $1\frac{1}{2}$ inch, depth 1 inch, while this was much enlarged below by the large ethmoidal cells, extending up to the orbital margin. The left incision was completely closed by sutures, and the right closed except for median one inch, through which both sinuses have been packed. The patient has made an uneventful recovery, with no depression or deformity, a slight pitting at point of dressing can be remedied with paraffin.

In regard to dressing this and other similar cases, I will say that for the first two or three weeks the dressing has been attended with so much pain that it has been necessary to give the patients a fourth grain of morphia every time, as they nearly fainted or collapsed from shock every time I attempted to dress them.

The interesting features of this case are:

1. Obscure symptoms—frontal pain and tenderness the only guide.
2. Nasal cavities normal in appearance.
3. No discharge of pus from nose for the last four years.
4. The large size of the sinuses.
5. Bridge of skin and periosteum left over glabella, preventing depression.
5. Transillumination negative.
7. Both sinuses dressed through one external opening.

Case of Maxillary or Dental Cyst, "Hydrops Antri Highmori."

By GEO. E. SHAMBAUGH, M.D., Chicago, Ill. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. WILLIAM E. CASSELBERRY: A few years ago two cases passed under my observation which together with a review of the literature I published under the name of "Serous Disease of the Maxillary Antrum." The first case was acute, and, on making an

exploratory puncture through the nasal wall, I drew out two syringes full of a clear straw-colored serous fluid. I repeated this operation with the same result on the following day, and again on the third day when pus appeared in place of the serous fluid. The other case was chronic, one of nasal polypi in which transillumination did not show a distinct shadow. This test being indecisive, repeated puncture tests were made, first for diagnosis and later at weekly intervals to afford samples of the clear serum obtained, for the purpose of chemical and bacteriologic examination. The serum was taken out through the antro-nasal wall with a Schmidt syringe, the punctures being made in various locations, in order to embrace the entire cavity or antrum in the tests, as far anteriorly and posteriorly as possible, up and down, but always the same kind of fluid, namely, a perfectly clear opalescent, slightly yellowish material was withdrawn. The disease was bilateral, hence if cystic, the cysts, one on each side, must have totally filled the antra. In looking up the subject, I found there were three conditions which had been confused one for another. The first is the so-called dentigerous cyst, which originates in the anterior wall of the antrum and which has been so well described by the essayist, the distinction which he draws as regards the bulging of the anterior antral wall being a useful one. In neither of the two cases which I reported under the name of "Serous Disease of the Antrum," was there any bulging or malformation of the anterior wall of the antrum. The second condition is that of a cyst within the antrum due to degeneration of a polypus or closure of a glandular duct (not a dental cyst), and in the two cases which I reported, as serous disease and in others described in the literature, it is difficult to decide whether the fluid may not have been cystic rather than a serous exudate free in the antrum, with possibly a closed antrum orifice. I believe it to have been a free muco-serous exudate in my cases. Killian and Hajek while regarding cystic formations as more numerous, accept as possible the free accumulation within the antrum of muco-serous and serous fluid, and other modern authors cite cases in which there was no cyst wall and no "rest" or single angle unfilled and to these cases the name "serous disease" or "hydrops antri inflammatorius" is given.

Doubtless most of the cases of "hydrops antri" from the older literature were dentigerous cysts but the term is not now thus limited being used to embrace also non-dentigerous cysts within the antrum and free "serous disease" of the antrum, the latter being "hydrop antri inflammatorius."

DR. JOSEPH C. BECK: I would like to ask Dr. Shambaugh whether he punctured the cyst or not?

DR. SHAMBAUGH: I did not.

DR. BECK: I had a case of dentigerous cyst two years ago. The patient presented very much the same symptoms as those reported by Dr. Shambaugh. The patient declared that he had a capped tooth which was exceedingly sensitive. He was a man, 35 years of age. I had the capped tooth extracted, and found beyond it a large cyst filled with straw-colored fluid. I dissected the cyst wall thoroughly and packed it, believing it would heal by granulations as we know that these cavities do not collapse very easily.. I did not succeed in filling it out, and I secondarily removed a portion of the cyst wall which was not very hard in consistency. It was not compressible, so that I could press it in to eliminate the cavity. This patient developed a sarcoma on top of this condition, and succumbed to that disease.

Cases of large dentigerous cysts are on record. For instance, Killian found one leading clear up to the nasal cavity which became malignant.

A point that interested me particularly in Dr. Casselberry's discussion was with reference to finding fluid in the antrum post-mortem. We are all doubtless familiar with the results of Win-grave's investigations of the post-mortem examinations of sinuses, finding them filled with fluid in most instances. Disease of the antrum does not always exist when there is fluid found after death.

DR. NORVAL H. PIERCE: There are two attractive points that have been brought out by the essayist and by the discussion. First, we cannot depend on the sensation of crepitus in these cases in differentiating dentigerous cysts from sarcoma. We may get the same sensation precisely from a dentigerous cyst that we get in a sarcoma. I believe it is the consensus of opinion of late investigators and writers that no inflammatory condition of the antrum of Highmore causes a bulging. Whenever we get this condition, we have to do with a cyst, a dentigerous cyst being in all probability the most frequent. This is due to a physical fact, namely, that in order to push downward or outward the wall of the antrum of Highmore, the cyst or the condition causing the bulging, the displacement, must have a point of purchase, which dentigerous cysts have, as they form primarily in the bone. Of course, in inflammatory conditions we have bulging of the fontanelle, the middle meatus, as it has been termed, and I have frequently seen bulging in empyema, but aside from this valuable differential point we do

not get displacement of any other wall in inflammatory conditions, but we do get it in the cystic condition, and in all cases in which there is tumor formation in the wall.

DR. SHAMBAUGH (closing): Where we have a case presenting the symptoms which this one shows of a bulging of the facial wall of the antrum the question whether the trouble is due to antrum disease is out of consideration. This question has long been cleared up and we know at once that we have to do with a dentigerous cyst.

The term *hydrops antri*, as formerly used in the literature, applied to cases of supposed antrum disease where a bulging of the anterior wall was present and as characteristic of this disease was given the crepitus produced by pressure. The term originated under a mistaken conception of the real condition. I see no reason why the term *hydrops antri* should not be still used, not applying to cases where this ectasia exists, but where the antrum is the seat of disease such as an accumulation of secretion as was found in one of the cases, at least, of the two described by Dr. Casselberry several years ago. I am not aware, however, that this use of the term *hydrops antri* has been made.

Dental cysts do not always produce a bulging of the facial wall of the antrum; they sometimes produce a bulging into the roof of the mouth and sometimes the dental cyst will be produced at the expense entirely of an antrum, sometimes even causing an almost complete obliteration of this sinus. In such a case, where the cyst has grown into the antrum without producing an ectasia of the facial wall or the roof of the mouth, it will be found quite difficult to make a positive diagnosis of the condition. Should one suspect from certain indefinite symptoms that the antrum was the seat of disease and a puncture of the antrum wall is made with extraction of fluid, it would be found quite difficult to determine which of the three following conditions were present, a dental cyst, a cystic degeneration of the mucous lining of the antrum or the condition of fluid filling the cavity of the antrum. It may be that a study of the fluid which one withdraws in making the puncture may assist in determining its origin.

DR. WILLIAM E. CASSELBERRY: The fluid from my cases of serous disease which I had carefully examined by competent microscopists at the time, was practically sterile. It had a little fibrin, serum-albumin, a few epithelial and lymph cells, but did not contain cholesterolin. It has been stated that the contents of cysts contain cholesterolin, this being regarded as one distinction.

Membranous Rhinitis, Non-Diphtheritic. By CHARLES M. ROBERTSON, M.D., Chicago, Ill. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. LOUIS OSTROM: I saw a case similar to those that have been reported three weeks ago. The patient was a man, 50 or 60 years of age, the proprietor of a piano and organ factory. He presented himself with a distinct membrane extending over the uvula towards the margin of the soft palate, the pharynx, post-nasal space, and about halfway forward on the turbinates. Smears from it showed pure streptococcus; no diphtheria. The health report showed no diphtheria. The condition lasted about a week. He had a very high temperature, suffered much pain, and had acute tubal catarrhal otitis media, with severe earache, which did not, however, pass into suppuration.

DR. WILLIAM E. CASSELBERRY: We know that pseudo-membranous exudates in the pharynx are usually diphtheritic, but they are not invariably diphtheritic, and there is no reason why the same dictum should not pertain to the nose. No doubt the usual type of membranous rhinitis is diphtheritic, in a sense, but cultural tests and the clinical course are apt to differ from ordinary diphtheria. It does not produce the same degree of systemic depression, and it is not as virulent as regards extension to other parts as is a case of regular diphtheria. Nevertheless, these variations are differences of degree rather than of kind; the fact remains that the majority of cases of membranous rhinitis are certainly diphtheritic, in the sense that they are mild forms of diphtheria, and capable of transmitting diphtheria, but as stated by the essayist, we do have exceptional cases which are not diphtheritic. I recall having published three cases of membranous rhinitis, one of which was non-diphtheritic. It was in the person of a physician infected after attending a scarlet fever case. He had also a pseudo-membranous pharyngitis but the membrane was of a thin inflammatory character rather than typical of diphtheria. The membrane in the nose looked as much like a diphtheritic membranous rhinitis as it possibly could but culture tests excluded the Klebs-Loeffler bacillus. The case presented symptoms of erysipelas later on, which led to my statement at the time that the micro-organism of erysipelas was probably causative of the membranous rhinitis. The other two cases were much like this one minus the pharyngeal complication and the erysipelatus hue, yet they were diphtheritic as proven by culture. One was a trained nurse, who was infected during attendance on a diphtheria case, the other a physician who was prac-

ticing intubation often for laryngeal diphtheria, yet in both the nasal disease ran its usual mild course.

DR. ROBERTSON (closing): There was one point that I did not bring out in my paper that I should like to speak of now. In cases in which the exudate develops staphylococcus, it is altogether probable that we should not get the germ that produces the exudate, but rather the germ that is present after the exudate is formed. The staphylococcus, although nearly always present in these exudative forms of the disease, both in the throat, ear and nose, is secondary. The primary bacillus or coccus has done its work, whether it be pneumococcus, influenza bacillus, streptococcus, or colon bacillus; and then has disappeared. The bacillus does its work and is reabsorbed by the system, producing the systemic poisoning that we get. Then the staphylococcus comes on as a secondary infection.

Dr. Fenton B. Turck is making some experiments now on the mucous membrane of dogs, that is, the mucous membrane of the colon and intestine, and he finds that the staphylococcus predominates after the membrane is formed, the germ that causes the primary infection disappears, producing the systemic poisoning.

A Cure of So-called Laryngeal Vertigo (Bronchial Syncope.) By CHARLES J. WHALEN, M.D., LL. B. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. WILLIAM E. CASSELBERRY: One case I recall at this time, which however, would better be known as laryngeal crisis, inasmuch as that was the name I gave it at the time and it did not correspond to the typical Charcot description of laryngeal vertigo, since the man did not actually lose consciousness, and he did not suffer actual convulsive movements. He would be taken especially at meal-time, sometimes when he had not yet commenced to eat, with a slight cough, a strangling sensation, a sense of tickling in the larynx, and then constriction as if his wind was cut off. He would either fall off the chair or would have to be helped from the table, but I could not get from him the fact that he ever had total loss of consciousness. He had an enlarged lingual tonsil, which I removed but without benefit as far as the laryngeal crisis was concerned. The condition extended over several years, the crises gradually becoming less prominent but in the course of five years, locomotor ataxia became plainly manifest so that I have since regarded the laryngeal crises as prodromal symptoms of the locomotor ataxia, of a nature similar to gastric crisis and other curious prodromal symptoms of tabes. I do not mean to suggest that the essayist's case of laryngeal vertigo is of a tabetic nature but only that some centric neurosis is the etiological factor.

DETROIT OPHTHALMOLOGICAL CLUB.

Meeting of May 1, 1906.

G. L. RENAUD, M.D., Chairman.

Labyrinthitis in Secondary Stage of Syphilis. By G. L. RENAUD, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. FROTHINGHAM reported a similar case of labyrinthian trouble due to syphilis. The patient could not hear the watch even on contact and the bone conduction indicated pure labyrinthian disease. Recovery occurred under specific treatment. The members were agreed as to the rarity of this affection.

Exophthalmos and Adenoid Vegetations. B. HOLTZ. *Rev. Heb. de Laryngol. etc.*, July 1 1905.

The author reports two interesting cases in which the existence of exophthalmos appeared to be due to adenoid vegetations.

In the first case, a boy of seven years, affected with exophthalmos, especially on the right side, an examination of the naso-pharynx revealed very large adenoid vegetations. The removal of these was followed in about ten days, by the entire disappearance of the exophthalmos. This symptom, however, reappeared about two years later, and at the same time a recurrence of hypertrophy of the pharyngeal tonsil. Adenotomy was again followed by the disappearance of the exophthalmos, and this time permanently.

In the second case also, a boy of about seven years, the exophthalmos was accompanied by hypertrophy both of the pharyngeal and the faucial tonsils. The removal of the latter was followed by some improvement in the exophthalmos, but this did not entirely disappear until the removal of the adenoid vegetations.

SCHEPPEGRELL.

